



PC Server Enterprise Expansion Enclosure

User's Handbook

Note

Before using this information and the product it supports, be sure to read the general information under Appendix B, "Product Warranties and Notices" on page 115.

First Edition (January 1996)

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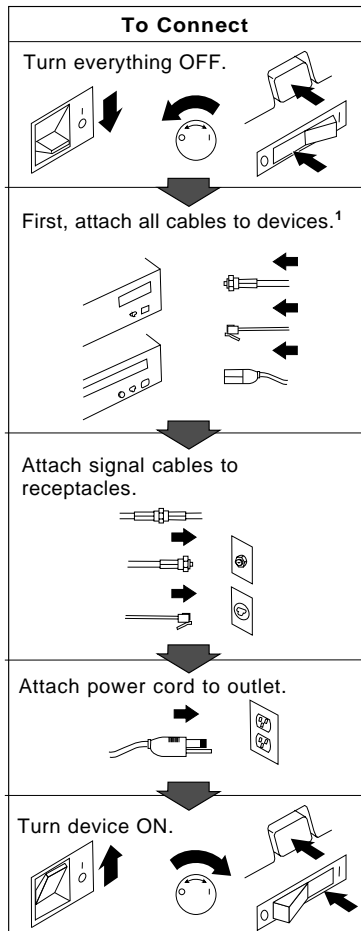
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Safety Information

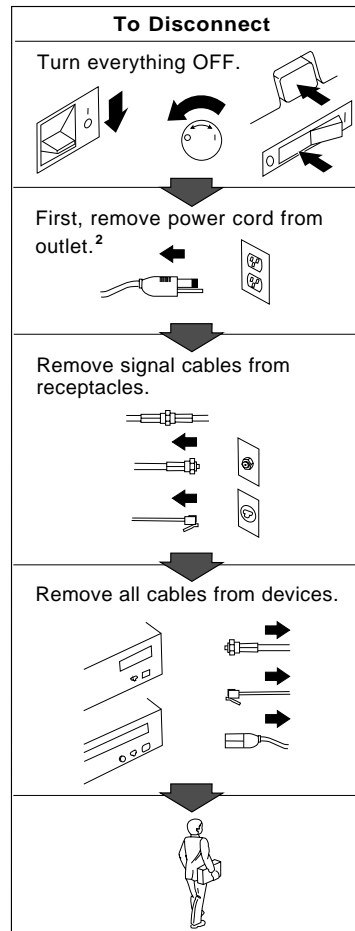


DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



¹ In the U.K., by law, the telephone cable must be connected after the power cord.

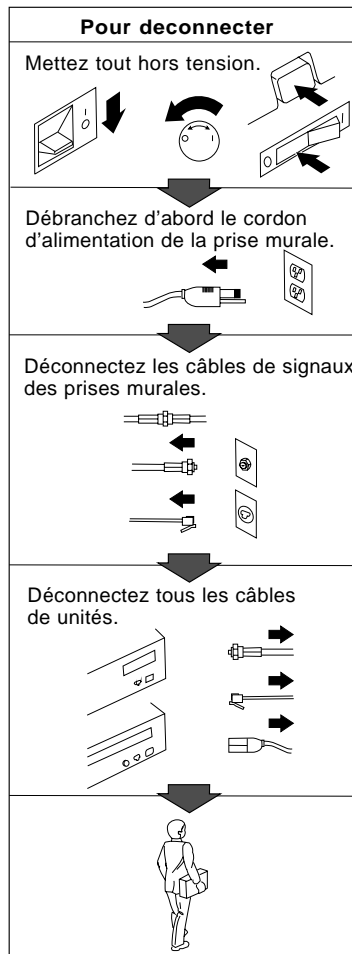
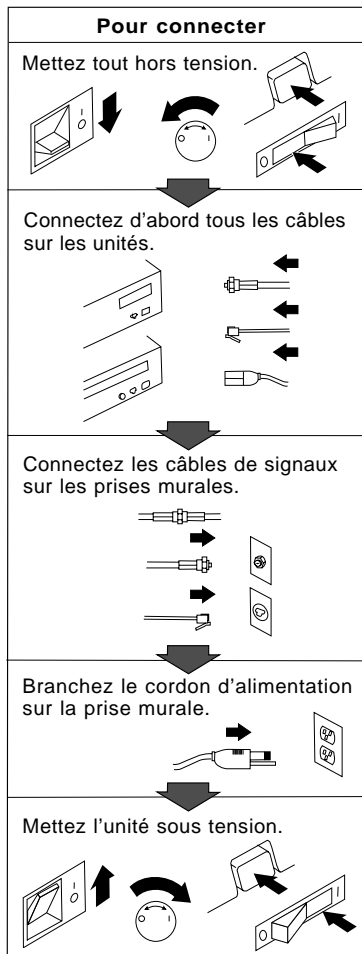


² In the U.K., by law, the power cord must be disconnected after the telephone line cable.



DANGER:

Le courant électrique provenant des câbles d'alimentation, téléphoniques et de transmission peut présenter un danger. Pour éviter tout risque de choc électrique, connectez et déconnectez ces câbles comme indiqué ci-dessous lorsque vous installez ou déplacez ce matériel ou les unités connectées, ou que vous soulevez un carter.*



*Le cordon d'alimentation doit être branché sur un socle de prise de courant correctement mis à la terre.

About This Book

This book provides the instructions for installing and removing options in your expansion enclosure. It also provides information on troubleshooting your expansion enclosure.

How This Book is Organized

Chapter 1, “Introducing the Enterprise Expansion Enclosure,” introduces and describes the PC Server Enterprise Expansion Enclosure. This chapter also includes an overview of the expansion enclosure's features and components. In addition, this chapter contains instructions for starting the expansion enclosure.

Chapter 2, “Installing and Removing Drives,” contains step-by-step instructions for adding backplanes and cables to the expansion enclosure, and for installing and removing drives.

Chapter 3, “Solving Problems,” contains the problem symptoms and error messages that are specific to your expansion enclosure. This chapter also contains information about checking the expansion enclosure for damage and how to get assistance and service.

Appendix A, “Expansion Tower Records,” provides a section to record and update important information about your expansion enclosure, including the serial numbers, key number, and device records (which contain configuration information). Whenever you add drives to your expansion enclosure, be sure to update the information in this appendix.

Appendix B, “Product Warranties and Notices,” contains product notices and trademarks.

About This Book

Notices Used in This Book

This book contains information notices that relate to a specific topic. The notice definitions are as follows:

- **Notes**

These notices provide important tips, guidance, or advice.

- **Attention**

These notices indicate possible damage to programs, devices, or data. An attention notice appears just *before* the instruction or situation in which damage could occur.

- **Caution**

These notices indicate situations that potentially can be hazardous to you. A caution notice appears just *before* the instruction or situation that could be hazardous.

Related Publications

In addition to this handbook, the following publications are included with your expansion enclosure:

- The *Setup* sheet contains the instructions for unpacking, setting up, and cabling your expansion enclosure.
- A *PC Server Service and Support* pamphlet contains important information and phone numbers to call for different types of support for your expansion enclosure.

The *IBM PC Servers Hardware Maintenance Manual Supplement* is available for purchase. It contains error codes, advanced diagnostic procedures, and a parts catalog for your expansion enclosure. This manual is intended for trained service technicians.

For a complete listing of publications available in the U.S. and Puerto Rico, call 1-800-426-7282. In Canada, call Customer Assistance at 1-800-465-1234. In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

Welcome and Thank You

Welcome and Thank You

We appreciate your decision to purchase an IBM PC Server Enterprise Expansion Enclosure. This expansion enclosure allows you to expand the storage capabilities of your system.

The publications that come with your expansion enclosure consist of the *Setup* sheet, this *User's Handbook*, and a *PC Server Service and Support* pamphlet. The *Setup* sheet contains the instructions to help you set up your PC Server Enterprise Expansion Enclosure. The *User's Handbook* contains the instructions for installing options (drives) and solving problems. The *PC Server Service and Support* pamphlet contains important information and phone numbers to call for different types of support for your expansion enclosure.

The PC Server Enterprise Expansion Enclosure also comes with IBM PC Server Startup Support, which provides coverage during the first 90 days after installation. IBM PC Server Startup Support is available to PC Server customers at no additional charge. This comprehensive program enhances IBM's support for setup, installation, configuration, and problem determination. It provides assistance for popular network operating systems and network adapters from IBM and other vendors. In the U.S., call IBM at 1-800-772-2227, or in Canada, call 1-800-565-3344 if you need assistance. In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

Chapter 1. Introducing the Enterprise Expansion Enclosure

The PC Server Enterprise Expansion Enclosure is a SCSI storage enclosure that you can attach to an external SCSI-2 connector on your server.

The expansion enclosure supports up to 18 hot-swap drives. When they are connected to a redundant array of independent disks (RAID) adapter in your server, you can configure these drives to increase the size of your existing disk array or configure them as a separate disk array.

The expansion enclosure also allows you to daisy-chain the backplanes (connect the backplanes serially).

This chapter contains an overview of the expansion enclosure features and components. In addition, this chapter describes how to start the expansion enclosure.

Refer to the *Setup* sheet for instructions for setting up your expansion enclosure.

This chapter contains:

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Features at a Glance

The following is a summary of the features that are available with the PC Server Enterprise Expansion Enclosure.

<p>Expansion Bays</p> <ul style="list-style-type: none">• 20 drive bays, 18 of which are hot-swap bays <p>Options Supported</p> <ul style="list-style-type: none">• Up to 18 slim-high or 9 half-high hot-swap hard disk drives (1 GB, 2 GB, and 4 GB)• Tape autoloader• 4/10 GB 3.5-inch DAT tape drive• CD-ROM drive	<p>Security Features</p> <ul style="list-style-type: none">• Bolt-down capability• Door lock• Security cover (optional) <p>Information Panel</p> <ul style="list-style-type: none">• Two 16-character lines• LCD display of diagnostic and status information <p>Integrated Function(s)</p> <ul style="list-style-type: none">• LED usability support	<p>Power Supply</p> <ul style="list-style-type: none">• 470-watt with automatic range voltage selection (115–230 V ac)• Built-in overload and surge protection• Power supply upgrade expansion option<ul style="list-style-type: none">– 220-watt automatic range voltage selection– Built-in overload and surge protection
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Specifications

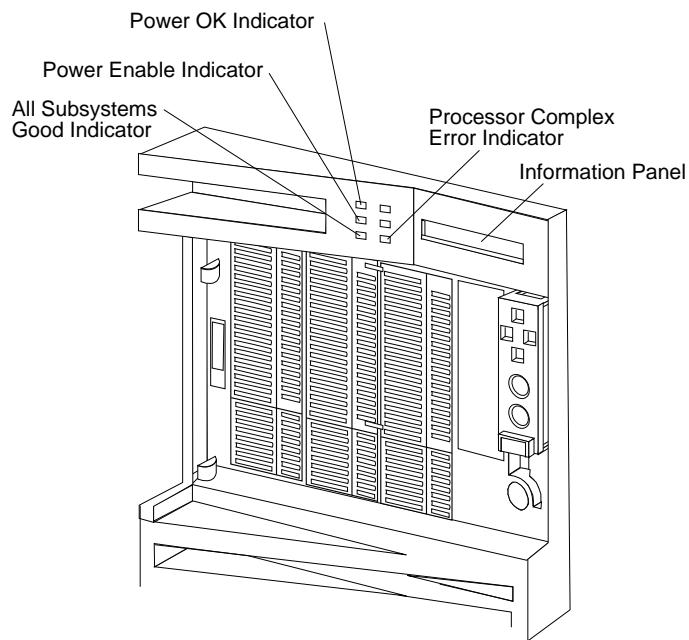
The following is a summary of the physical specifications for the PC Server Enterprise Expansion Enclosure.

<p>Size</p> <ul style="list-style-type: none"> • With pedestal: <ul style="list-style-type: none"> - Depth: 635 mm (25 in.) 835 mm (32.8 in.) with cable cover - Height: 635 mm (25 in.) - Width: 247 mm (9.75 in.) <p>Weight</p> <ul style="list-style-type: none"> • Minimum configuration as shipped: 29.1 kg (64 lb) <p>Environment</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> - System on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914 m (3000 ft.) - System on: 10° to 32°C (50° to 90°F) Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.) - System off: 10° to 43°C (50° to 110°F) Maximum Altitude: 2133 m (7000 ft.) 	<ul style="list-style-type: none"> • Humidity: <ul style="list-style-type: none"> - System on: 8% to 80% - System off: 8% to 80% • Maximum altitude: 2133 m (7000 ft) <p>Electrical Input</p> <ul style="list-style-type: none"> • Sine-wave input (50 to 60 Hz) is required • Input voltage: <ul style="list-style-type: none"> - Low range: <ul style="list-style-type: none"> - Minimum: 90 V ac - Maximum: 137 V ac - High range: <ul style="list-style-type: none"> - Minimum: 180 V ac - Maximum: 265 V ac - Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> - Minimum configuration as shipped: 0.16 kVA - Maximum configuration: 1.0 kVA 	<p>Total Power Available for Drives</p> <ul style="list-style-type: none"> • Nominal operating current allowed: <ul style="list-style-type: none"> - +5 V dc line: 7.5 A base; 20.5 A with upgrade - +12 V dc line: 4.7 A base; 17.7 A with upgrade <p>Heat Output</p> <ul style="list-style-type: none"> • Approximate heat output in British Thermal Units (BTU) per hour: <ul style="list-style-type: none"> - Minimum configuration: 150 BTU (44 watts) - Maximum configuration: 3600 BTU (1055 watts)
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Status Indicators


Your expansion enclosure has four light-emitting diode (LED) indicators that show the system status (and two additional indicators for future use). These indicators are shown in the following illustration and are described in the list that follows it.


In addition, the front panel of your server contains a two-line by 16-character liquid crystal display (LCD) area. This LCD area is called the information panel.



OK **All Subsystems Good:** This green indicator shows that all of the expansion enclosure subsystems are working properly.

 **Power Enable:** This green indicator shows that the expansion enclosure power on and off capability is enabled. When this light illuminates, the expansion enclosure is available for turning on and off remotely or through the Power On/Off button.

 **Power OK:** This green indicator shows that the expansion enclosure power supply is working properly.

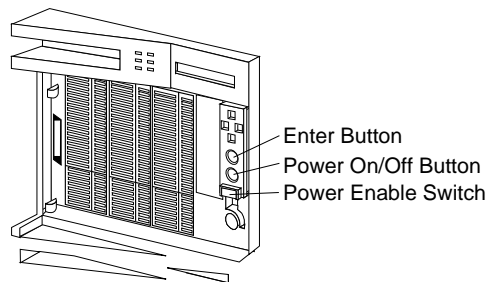
 **Processor Complex Error:** This amber indicator shows that the expansion enclosure has encountered a problem.


Information Panel: The information panel displays the system status messages.


Note: If your expansion enclosure stops running during test or normal operation, record the data that appears on the information panel; then call for service and tell the service technician what appeared on the panel.

Front Panel Controls

The front panel contains buttons and switches, shown in the following illustration, that control the operation of the expansion enclosure. Descriptions of these controls follow the illustration.



 **Enter:** Use this button to clear error messages from the information panel.

 **Power On/Off:** Use this button to turn your expansion enclosure on and off. To turn on the expansion enclosure, ensure that the Power Enable indicator is illuminated; then press the Power On/Off button momentarily. The Power OK indicator will illuminate in approximately one second.

To turn off the expansion enclosure, press and hold the Power On/Off button. The information panel then displays a SHUTTING DOWN message.



Power Enable: Use this switch to enable the expansion enclosure power on and off capability. Before you can turn on your expansion enclosure the first time, you must press the Power Enable switch, and then press the Power On/Off button. Otherwise, your expansion enclosure will not operate. You must keep the Power Enable switch active to maintain the power-on capability.

The Power Enable switch controls the Power Enable indicator. That is, the Power Enable indicator illuminates only when power to your expansion enclosure is enabled.

Notes:

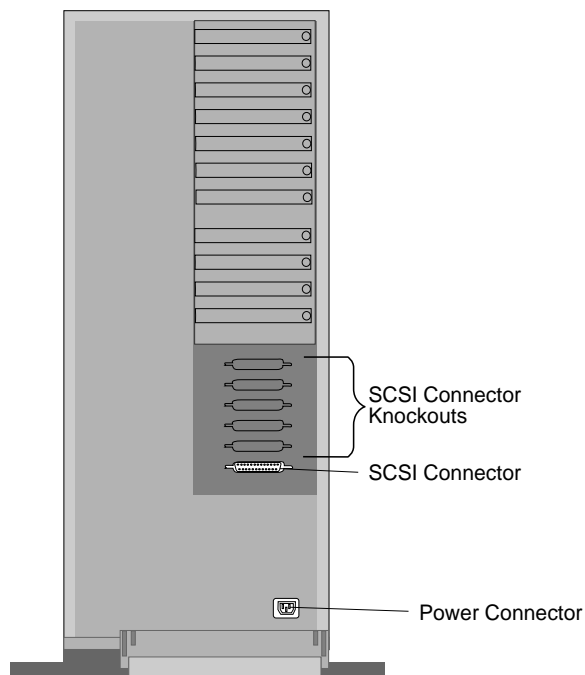
1. The Power Enable switch is located under a transparent cover on the right side of the front of the expansion enclosure. You must lift this cover up to reach the switch.

To avoid accidentally pressing the Power Enable switch after you have turned the expansion enclosure on or off, return the transparent cover to its original position.

2. The keypad buttons are currently not supported in the expansion enclosure.

Input/Output Connectors

The following illustration shows the input/output connectors provided by your expansion enclosure.



SCSI Connector Knockouts: You can remove the SCSI connector knockout covers in order to connect additional SCSI-2 cables.

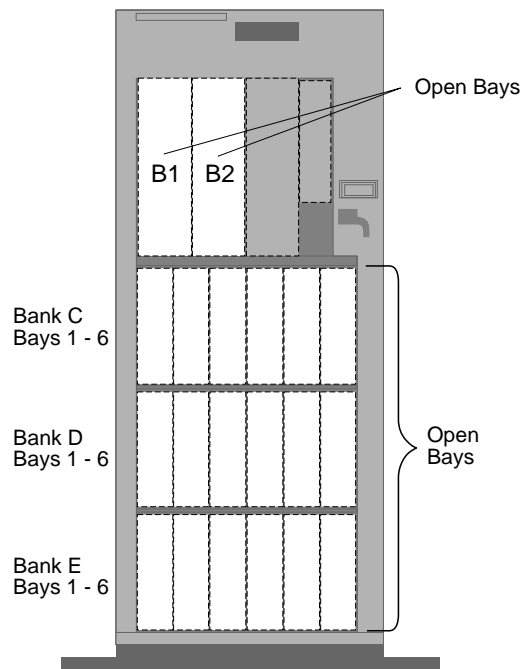


SCSI Connector: A SCSI-2 cable attaches here, and connects to a SCSI-2 external connector on the server. For disk-array models, the cable connects to the external SCSI-2 connector on a RAID adapter such as the IBM SCSI-2 Fast/Wide Streaming-RAID Adapter/A.

Power Connector: The power cable connects here.

Expansion Bays

In the open bays in your expansion enclosure, you can add CD-ROM drives or tape drives.



You can install CD-ROM drives or tape drives in bays B1 and B2.

Your expansion enclosure supports up to 18 hot-swap, 3.5-inch hard disk drive IIIs in the lower bays (banks C, D, and E). For installation instructions and information on the types of drives that you can install in each bay, see Chapter 2, "Installing and Removing Drives" on page 15.

Note: For the latest information on available options, contact your IBM reseller or IBM marketing representative.

Before You Begin

- Make sure you have an adequate number of properly grounded electrical outlets for your expansion enclosure, as well as for your server, monitor, and any external options connected to your system.
- Place your expansion enclosure in a location that is dry. Rain or spilled liquids might damage your enclosure.
- Leave about 51 mm (2 in.) of space around the front and rear of your expansion enclosure to allow the expansion enclosure's cooling system to work properly.

If you have not already done so, perform the following tasks. Instructions are located on a separate setup sheet that comes with your expansion enclosure.

1. Unpack your expansion enclosure.
2. Remove the packing material.

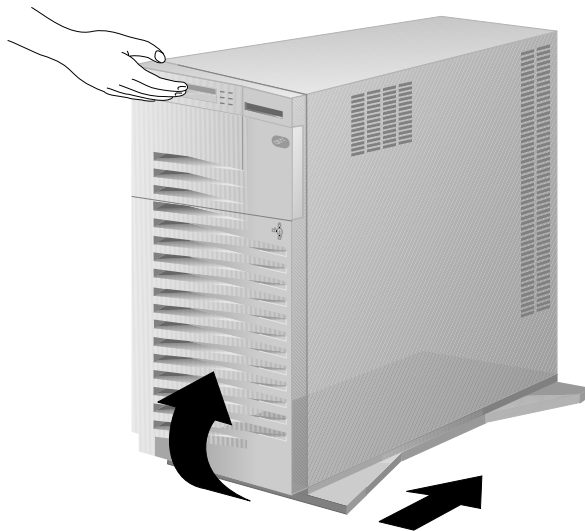
Moving the Expansion Tower

Moving the Expansion Tower

CAUTION:

Due to the weight of the expansion enclosure, do not attempt to lift it by yourself. To avoid possible injury while moving or lifting the expansion enclosure, ask another person to help you.

When the expansion enclosure is in the normal upright position, move it by lifting up on the handle and rolling it forward or backward as shown. (A roller is built into the rear of the expansion enclosure base.)



Installing Options During Setup

If you have no options (such as CD-ROM drives, tape drives, or hard disk drives) to install, continue with “Starting the Expansion Tower” on page 12. If you have options to install, you can install them now or you can install them later, after you set up your expansion enclosure.

Should you install options later?

If you are not familiar with the features of your expansion enclosure, you might want to set up the expansion enclosure first and learn about its features before you install options. If you choose to install options later, connect the expansion enclosure to the server by connecting the power cord and SCSI connector to the back of the enclosure; then connect the SCSI cable to your server. If necessary, refer to the figure in “Input/Output Connectors” on page 7 for the location of the connectors on your enclosure and your server documentation for the location of the connector on your server. Then, go to “Starting the Expansion Tower” on page 12.

Should you install options now?

If you are already familiar with the features of the expansion enclosure, installing options now might save you some time.

To install options now, do the following:

1. To install a hot-swap drive III in bank C, use the procedure in “Installing a Drive in Bank C, D, or E” on page 66.
Note: Bank C comes ready to operate hot-swap drive IIIs.
2. To install an internal drive in bay B or banks D or E, go to “Installing Drives” on page 25.
3. To complete the installation, go to “Completing the Installation” on page 90.
4. To turn on the expansion enclosure, go to “Starting the Expansion Tower” on page 12.
5. To configure the drives that you install in the expansion enclosure, see your server documentation.

Starting the Expansion Tower

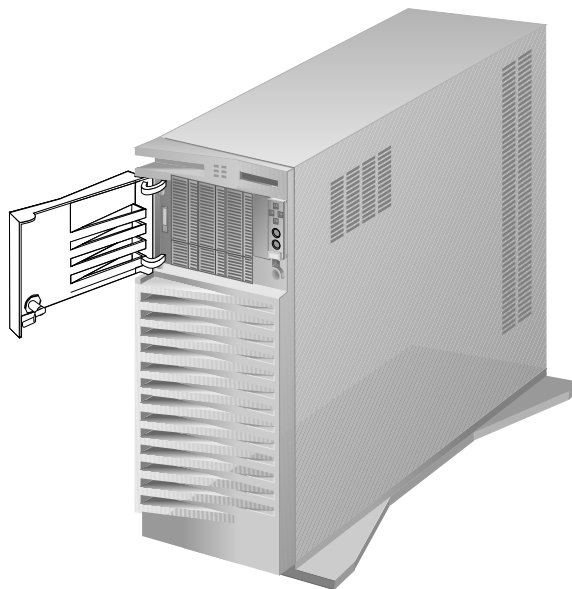
Starting the Expansion Tower

You can turn on the expansion enclosure without connecting it to a server. However, you must connect the expansion enclosure to a server before you can use the drives that you install in the expansion enclosure.

Note: To connect the expansion enclosure to the server, connect the power cord and SCSI connector to the back of the enclosure; then connect the SCSI cable to your server. If necessary, refer to the figure in “Input/Output Connectors” on page 7 for the location of the connectors on the enclosure and your server documentation for the location of the connector on your server.

To start the expansion enclosure, use the following procedure:

1. Locate the keys; then unlock and open the door.

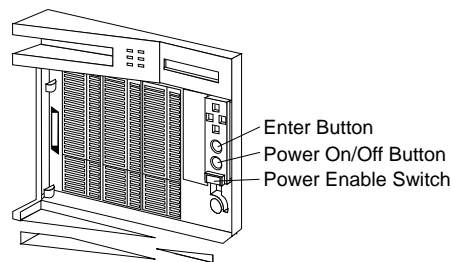


2. If your server is turned on, turn it off. (See your server documentation.)

Starting the Expansion Tower

3. Turn on your expansion enclosure.

To turn on the expansion enclosure, lift the transparent cover and press the Power Enable switch; the Power OK indicator will illuminate. Then, press the Power On/Off switch (located just above the Power Enable switch). The information panel will display IBM 3518.



4. Turn on your server. (See your server documentation for details.) The *power-on self-test (POST)* begins.
5. Check your server monitor. If you have an IBM PC Server, the screen displays the IBM logo and a number that represents the amount of available server memory. The server beeps once to indicate that it is working properly.

Notes:

- If you hear more than one beep or no beep, check the monitor and the information panel. If an error message appears on the *information panel*, see Chapter 3, “Solving Problems” on page 95. If an error message appears on the *monitor screen* or if your screen is blank, see the troubleshooting information in your server documentation.
- If your expansion enclosure or server stops running during testing or normal operation, call for service. Describe the problem to the service technician.

Starting the Expansion Tower

6. If you have drives to install in your expansion enclosure, go to Chapter 2, “Installing and Removing Drives.” If you have already installed drives in your expansion enclosure, refer to the instructions that came with the drives to see if device drivers are required, and how to install them. Refer to your server documentation for information on configuring drives and other options.

Chapter 2. Installing and Removing Drives

This chapter provides instructions to help you add drives to your expansion enclosure. Some drive-removal instructions are provided, in case you need to remove one drive to install another. If you have several drives to install, these instructions enable you to add them all at one time.

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Before You Begin

Before You Begin

- Become familiar with the safety and handling guidelines specified under “Safety Information” on page v, “Electrical Safety” on page 17, and “Handling Static-Sensitive Devices” on page 18. These guidelines will help you work safely while working with your expansion enclosure.
- Read the information in “Installing Drives” on page 25 for important information on the SCSI drives. Table 1 on page 28 provides a list of the hardware that you should have before installing drives in the expansion enclosure.

Electrical Safety

CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.

For your safety, always do the following *before* removing the cover:

1. Turn off the expansion enclosure.

Note: To turn off the expansion enclosure, press the Power On/Off switch. The Power On/Off switch is located above a transparent cover on the right side of the front of the expansion enclosure.

2. Unplug the power cord from the electrical outlet.
3. Disconnect all cables and power cords from the back of the expansion enclosure.

Note: Reconnect the cables or power cords only after you reassemble the expansion enclosure and put the covers back on.

CAUTION:

Never remove the cover on the power supply. If you have a problem with the power supply, have your system serviced.

Handling Static-Sensitive Devices

Static electricity, although harmless to you, can seriously damage computer components.

When you handle drives and other computer components, take these precautions to avoid damage from static electricity:

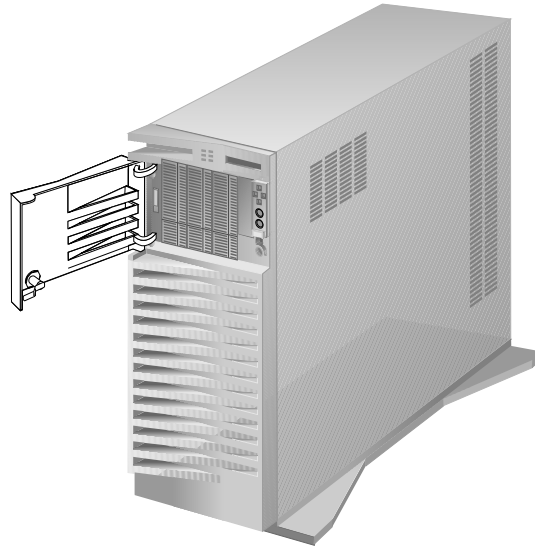
- When you are adding a drive or component, do not open the static-protective package containing the drive or component until you are instructed to do so.
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new drive or component, touch the static-protective package containing the drive or component to an unpainted metal surface on the expansion enclosure for at least two seconds (This reduces static electricity from the package and from your body.)
- When possible, remove the drive or component from its package and install it directly into the expansion enclosure without setting it down. When this is not possible, place the drive's or component's static-protective package on a smooth, level surface and place the drive or component on it.
- Do not place the drive or component on the expansion enclosure covers or other metal surface.

Preparing to Install Drives

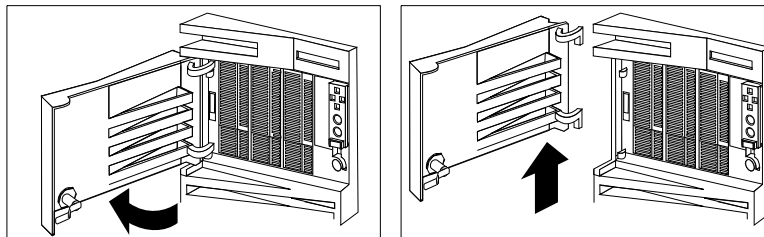
Before you begin:

Be sure you have read “Electrical Safety” on page 17 and “Handling Static-Sensitive Devices” on page 18.

1. Unlock and open the door.



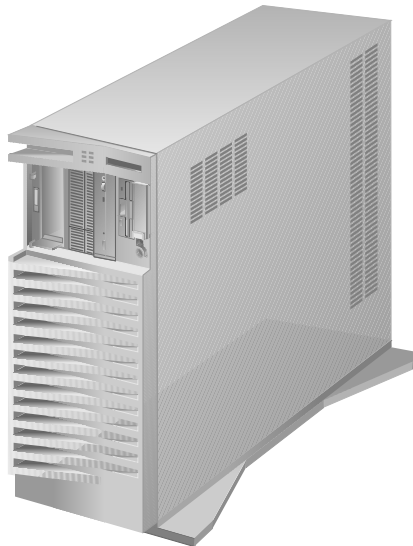
2. Remove the door by carefully lifting it up and off the hinges. Store it in a safe place.



Preparing to Install Drives

3. Remove all media (such as CDs or tapes) from any installed drives; then, turn off the expansion enclosure.

Note: To turn off the expansion enclosure, press the Power On/Off switch, on the right front of the expansion enclosure.

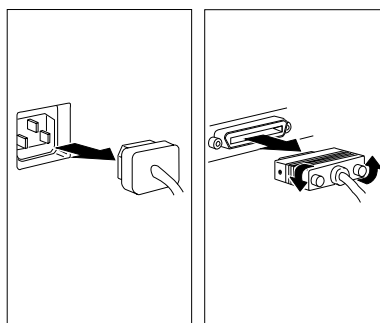
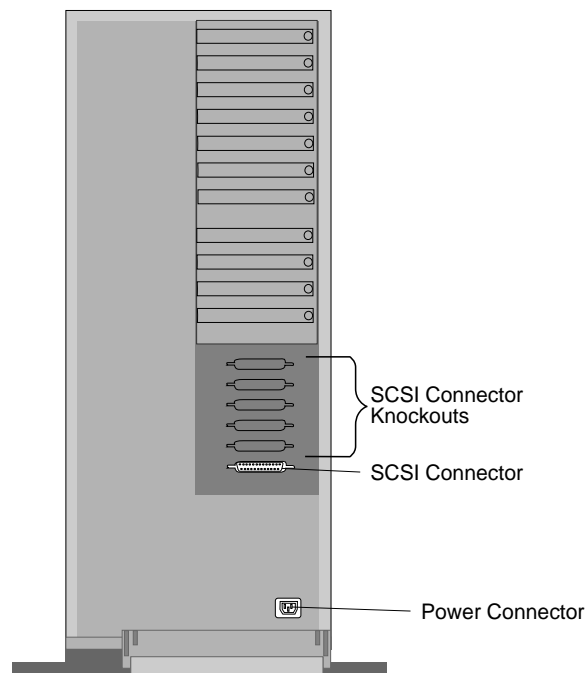


4. Turn off your server. (See your server documentation for details.)

Preparing to Install Drives

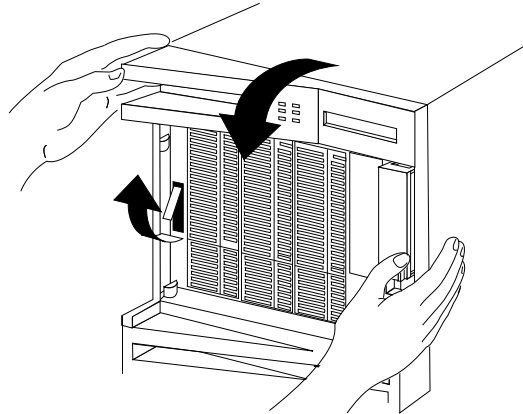
5. Unplug all power cords (cables) from electrical outlets.

Note the locations of the power cord and SCSI cable; then, disconnect them from the back of the expansion enclosure.

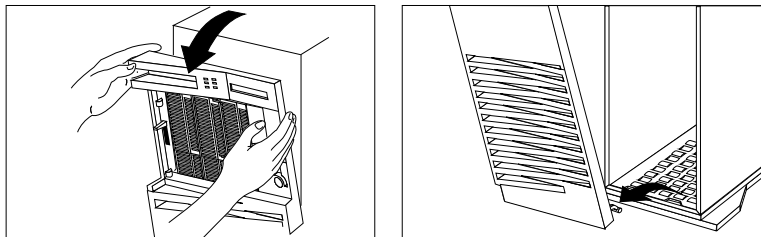


Preparing to Install Drives

6. Remove the front cover:
 - a. Release the latch on the left side of the expansion enclosure by pulling it up from the bottom.
 - b. Grasp the sides of the front cover and pull it forward. (Or, you may grasp the handle at the top-left corner of the expansion enclosure.)



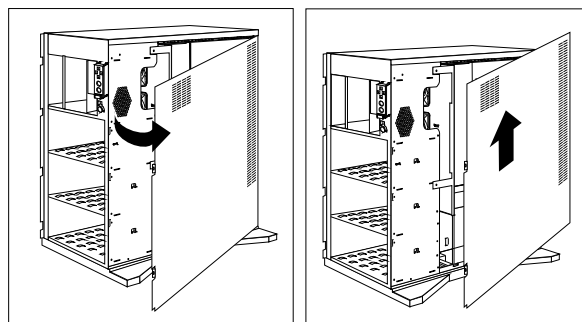
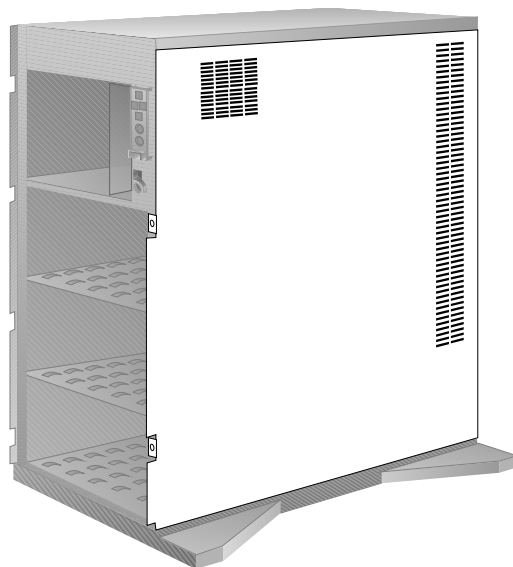
- c. Detach the front cover hooks from the grooves on the bottom of the expansion enclosure, and lift the front cover off.



- d. If you did not already do so during setup, remove the cardboard packing material from the expansion enclosure.

Preparing to Install Drives

7. Remove the side cover:
 - a. Pivot the side cover away from the front of the expansion enclosure.
 - b. Remove the cover by carefully lifting it up and off the hinges. Store it in a safe place.



Preparing to Install Drives

What to do next?

- To install an internal drive, go to “Installing Drives” on page 25.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To install or remove a security feature, go to “Security Procedures” on page 86.

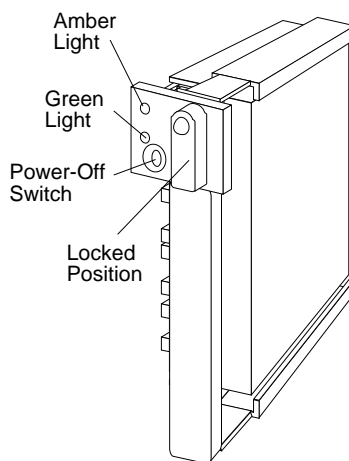
Installing Drives

If you add different types of drives, your system can read different types of media and store more data. Several types of drives are available, such as:

- CD-ROM
- Hard disk
- Tape

Your expansion enclosure contains hardware that lets you replace a failed hard disk drive without turning off the expansion enclosure. Therefore, you have the advantage of continuing to operate your system while a hard disk drive is removed or installed. These drives are known as *hot-swap* drives.

The hot-swap drive tray III for your expansion enclosure has a small switch that stops the movement of the disk drive. The tray also provides two LEDs (one green and one amber) to indicate the current state of the drive and tray.



Installing Drives

The following table summarizes the LED states on your hot-swap tray and their meanings.

Green	Amber	Description
On	Off	Drive tray is powered on; the hard disk drive is inactive; and the drive should <i>not</i> be removed.
Blinking	Off	The hard disk drive is inactive. The hot-swap drive can be removed safely.
On	On or Blinking	The hard disk drive is in use, and should <i>not</i> be removed.
Off	Off	The drive is defective, or no power is being supplied to the drive. The hot-swap drive can be removed safely.

Each hot-swap drive that you plan to install must have a hot-swap drive tray III attached. Trays are available for two drive types: narrow and wide. The narrow tray supports 8-bit drives; the wide tray supports 16-bit drives. Select the appropriate drive trays for your hot-swap drives. If necessary, contact your IBM reseller or IBM marketing representative to purchase the types of drive trays that you need.

Internal drives are installed in *bays*. (“Expansion Bays” on page 8 shows bay locations.) You can install two drives in bay B. You can install hot-swap hard disk drives in banks C, D, and E only. Banks C, D, and E each contain six bays; each bank can support up to six drives. However, when bay B is cabled to bank C or D, the linked bays support up to a total of six drives.

The SCSI output connector (*daisy-chain* connector) on the backplanes allows you to serially link two adjacent backplanes in banks C, D, and E. When you connect two banks serially, each bank supports up to three half-high drives. When backplanes are daisy chained, you can control the hard disk drives in the banks with a single SCSI channel; this allows you to support six half-high drives on a single channel.

Installing Drives

Note: The bank letter-designations are located on both vertical rails on the front of the server. The bay-slot numbers are located on the top of bank C and the bottom of bank E.

A *cover plate* (sometimes called a *bezel* or *face plate*) covers the front of the B bays. If you install a drive that uses removable media, such as CD-ROMs or tapes, you must remove this plate.

Considerations

- Bay B supports:
 - One 5.25-inch, full-high, removable-media or nonremovable-media device, or
 - Two 5.25-inch, half-high, removable-media or nonremovable-media devices
- You cannot install hot-swap drives in bay B.
- PC Server Enterprise Expansion Enclosure supports eighteen 3.5-inch, slim-high hot-swap hard disk drives or nine 3.5-inch, half-high hard disk drives in the bottom three banks (C, D, and E).
- If you install drives in bank D or E, you must remove the fan assembly on the rear of the expansion enclosure, install a direct access storage device (DASD) *backplane* in bank D or E, add power and internal SCSI cables, and have an optional 220-watt power supply installed by your IBM service technician. (Instructions for removing the fan assembly and installing a backplane are given in “Preparing Bank D” on page 46.)

You might need to install an additional SCSI-2 adapter in your server. (Refer to the documentation that comes with your server for more information and instructions if you need to install the adapter.)

- Each backplane has six connectors, to support up to six hard disk drives.
- An address jumper is located on the rear of each backplane. You must set the jumpers on these backplanes as described in “Setting the Backplane Address Jumper (J2)” on page 81.

Installing Drives

- A SCSI ID jumper (J12) is located on the rear of each backplane. When you daisy-chain two backplanes, you must set the jumpers on these backplanes as described in “Setting Backplane SCSI ID Jumpers (J12)” on page 82.
- If you are installing a drive in a hot-swap tray that has jumpers (for example, ID jumper), remove the jumper pin block from the drive.
- Table 1 summarizes the additional hardware that is needed to install some expansion enclosure options.

<i>Table 1. Required Hardware for Expansion Tower Drives</i>	
Drive	Required accessories
Internal, non-hot-swap drives (bay B)	<ul style="list-style-type: none"> • 8-bit or 16-bit drive, slim-high, half-high, or full-high • SCSI-2 cables <ul style="list-style-type: none"> – 4-drop non-hot-swap cable – 2-drop B-bay daisy-chain cable
Hot-swap backplane III	<ul style="list-style-type: none"> • Short internal SCSI-2 cable <ul style="list-style-type: none"> – 2-drop B-bay daisy-chain cable (to bank C or bank D) – Daisy-chain cable to connect banks D and E, or banks C and D^{1,2} • Long internal SCSI-2 cable, to connect to back panel
Hot-swap drives	<ul style="list-style-type: none"> • 8-bit or 16-bit drive • 8-bit or 16-bit hot-swap drive tray III • SCSI-2 cables <ul style="list-style-type: none"> – Backplane to back panel – Backplane to backplane (daisy chain) • Hot-swap backplane III installed in bank D or bank E³
<p><i>Notes:</i></p> <ol style="list-style-type: none"> 1. Backplanes support only half-high drives in these configurations. 2. Do not connect bank C to both bay B and bank D. 3. Bank C comes with a hot-swap backplane III. 	
<p><i>Also Note:</i> An external SCSI cable is required to connect the expansion enclosure to the server.</p>	

SCSI Drives

Some drives have a special design called *small computer system interface* or SCSI. This design allows you to attach multiple drives to a single SCSI-2 adapter.

Note: Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.

When you install additional SCSI devices, each SCSI device that is connected to the adapter needs a unique identification (ID) so that the SCSI-2 adapter can identify the devices and ensure that different devices do not attempt to transfer data at the same time. If you need to set IDs for SCSI devices, refer to the instructions that come with those devices.

Your expansion enclosure automatically sets SCSI IDs for hot-swap drives. These IDs are determined by the drive locations in the bays.

If more than one backplane is installed in your expansion enclosure, each backplane address jumper must have a unique setting. This setting identifies the backplane's location within the expansion enclosure and ensures proper enclosure operation. (See “Setting the Backplane Address Jumper (J2)” on page 81.)

The SCSI ID address jumper (J12), a pin block with four pairs of pins, is located on the rear of the backplanes in banks C, D, and E. When two backplanes are daisy-chained in your expansion enclosure, the first backplane address jumper (for example, Bank C) must be set to LO, defining the SCSI IDs as 0 through 5. The second backplane (in this example, bank D), must be set to Reverse, defining the SCSI IDs as 5 through 0). (See “Setting Backplane SCSI ID Jumpers (J12)” on page 82.)

The processing sequence for SCSI devices is set according to their IDs. Depending on the type of SCSI-2 adapter installed in your server, the adapter supports a total of 14 or 15 SCSI drives (internal and external). Refer to the documentation that comes with your server for more information.

Installing Drives

To configure the SCSI devices that you install in your expansion enclosure, use the appropriate configuration program (such as the SCSISelect utility program or the RAID configuration program) that came with your server. Refer to the documentation that came with your server for specific information about configuring your server.

There are two types of SCSI devices: wide and narrow. You must use 16-bit cables to attach wide devices. To attach a narrow (8-bit) device in bay B, use a 50-68 pin converter on a 16-bit cable. (That is, to install 8-bit devices, you need an 8-bit to 16-bit SCSI Internal Converter to connect an 8-bit device to the 16-bit cable.)

The devices in your expansion enclosure are connected to a SCSI adapter in your server. Two devices on the same bus (internal or external) cannot have the same ID; however, your server can use the same ID for devices not on the same bus. If you have an IBM PC Server that has multiple adapters installed, the drives that are connected to the adapter in the lowest-number expansion slot are assigned drive letters first.

When SCSI devices are chained, both ends of the chain (cable) require a *terminator*. The purpose of these terminators is to ensure that the quality of the signal is maintained throughout the SCSI chain. If you attach SCSI devices (internal or external), you must terminate the last device in the chain, or the end of the cable must be terminated.

Note: The backplanes automatically set termination for all the drives in the hot-swap bays.

The SCSI-2 adapter automatically adjusts for termination for IBM PC Servers. (Refer to the instructions that come with the SCSI device for more information about terminators. Refer to the documentation that comes with your server for additional information about your server's SCSI subsystem.)

Installing Drives

The SCSI ID for the SCSI-2 controller is normally set to 7. The backplane automatically sets SCSI IDs for hot-swap drives. If you need to set SCSI IDs for SCSI devices, refer to the instructions that come with these devices.

Note: Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.

SCSI IDs

A pin block with four pairs of pins (J12) is located on the rear of the backplanes in banks C, D, and E. When two backplanes are daisy-chained in your expansion enclosure, up to six total drives are supported. The first backplane address jumper (for example, bank C) must be set to LO (the default, no jumper), defining the SCSI IDs as 0 through 5. The second backplane (in this example, bank D) must be set to either HI or Reverse. See “Setting Backplane SCSI ID Jumpers (J12)” on page 82 for information on setting the backplane jumper.

Note: Two devices assigned ID “0” and attached to separate channels do not create a conflict.

Installing Drives

Preinstallation Steps (All Bays)

Before you begin:

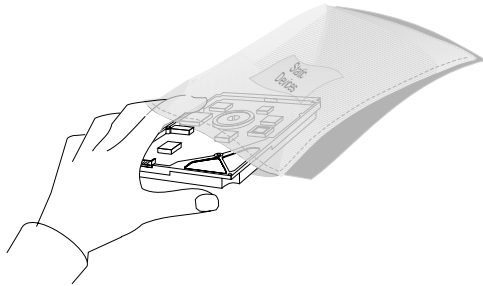
Be sure you have read “Electrical Safety” on page 17 and “Handling Static-Sensitive Devices” on page 18.

Before you can install drives in your expansion enclosure, you might need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option. Refer to the following table.

Required activity	Bay B	Bank C	Bank D	Bank E
Preinstallation activities				
Purchase hot-swap hard-disk drive III	No	Yes	Yes	Yes
Purchase and install backplane before installing first hot-swap drive	Not applicable	No ¹	Yes	Yes
Purchase second power supply and have it installed	No	No	Yes ²	Yes ²
Installation activities				
Remove fan assembly to attach cables before first use	Yes	No ³	Yes	Yes
<i>Notes:</i> 1. Bank C comes with a hot-swap backplane III installed. 2. Must have second power supply installed by IBM-certified technician (if not previously installed). 3. Bank C comes with a SCSI-2 cable attached to the SCSI-2 input connector on the backplane.				

Installing Drives

1. Choose the bay in which you want to install the drive.
2. Touch the static-protective bag containing the drive to any unpainted metal surface on the expansion enclosure; then, remove the drive from the bag.



3. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive, or if you need to attach a tray to the drive.

Notes:

- Automatic SCSI ID setting applies only to hot-swap hard disk drives. Therefore, if you install a non-hot-swap SCSI drive (in bay B only), you must set a SCSI ID for that drive.
- Remove the terminators from the drives that you plan to install in bay B. The cable that connects to bay B already has a terminator.

Installing Drives

What to do next?

- To install a drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To install a drive in bank C, D, or E, go to “Installing a Drive in Bank C, D, or E” on page 66.

Installing a Drive in Bay B

Before you begin:

Be sure you have:

- Purchased a two-drop B-bay cable or four-drop internal SCSI-2 cable.
- Removed the front cover (see “Preparing to Install Drives” on page 19).
- Prepared the drive for installation (see “Preinstallation Steps (All Bays)” on page 32).

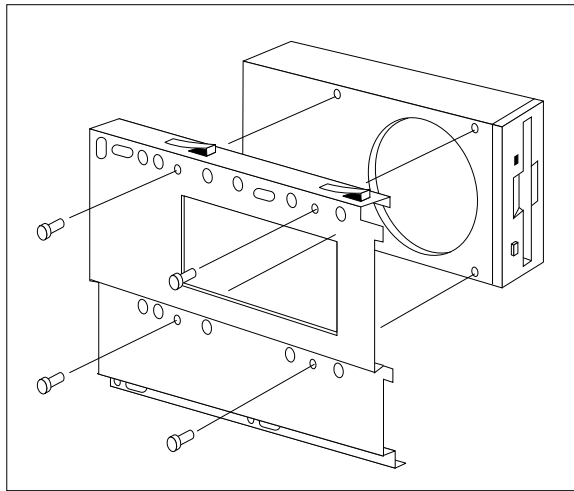
You can connect the drives in bay B to bank C or bank D. However, when you install slow devices such as tape drives in bay B, performance of the drives in bank C or D is affected. You might choose to connect these devices to a separate SCSI-2 adapter in the server.

Each time you install a SCSI drive in bay B and you want to connect it to bank C or bank D, you might need to remove a hot-swap drive. When bay B is cabled to bank C or D, the linked bays support up to a total of six drives. If you remove a drive from bank C or bank D, remove the drive that is at the end of the processing sequence. (See “Removing a Drive from Bank C, D, or E” on page 75 for instructions.)

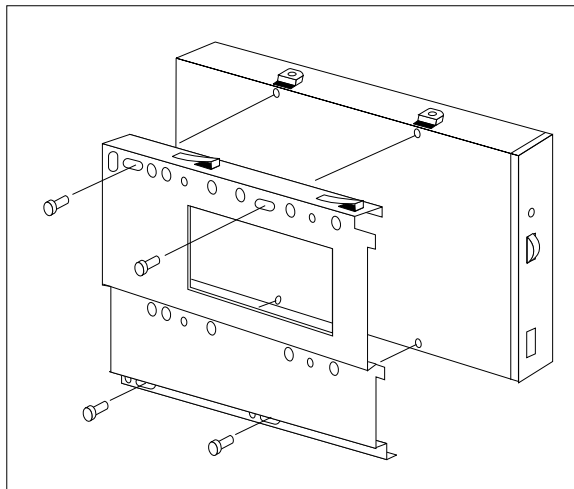
Attention: Before you remove a drive, back up all data.

Installing Drives

1. Each drive that you install in bay B must have a tray like that shown below. If your drive comes with a different tray, remove it and install the IBM tray that comes with the expansion enclosure.



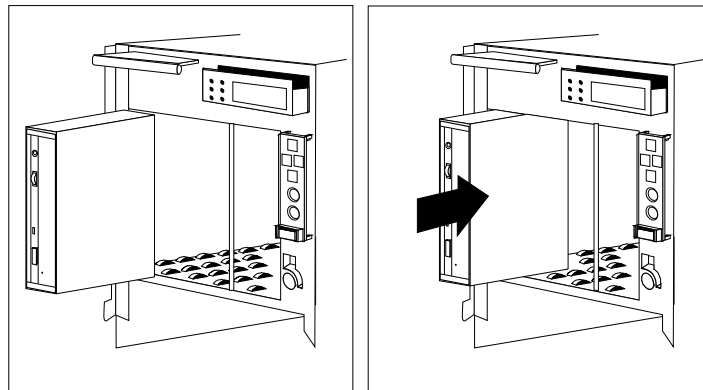
3.5-inch drive



5.25-inch drive

Installing Drives

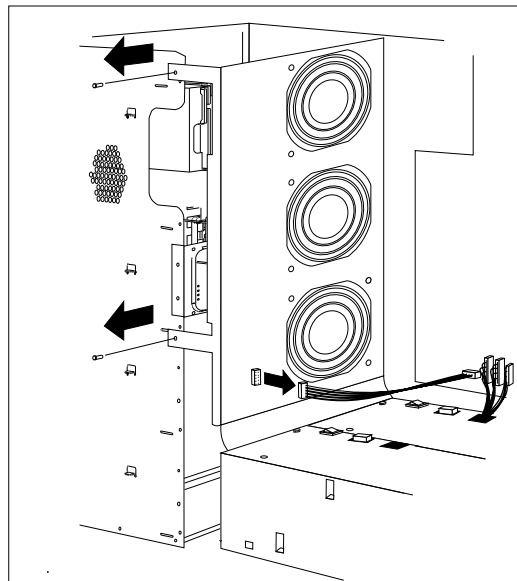
2. Install the drive:
 - a. Position the drive vertically, with the connectors facing the rear of the expansion enclosure.
 - b. Align the drive with the guides on the bottom of the bay and slide it to the rear of the bay until it stops.



Installing Drives

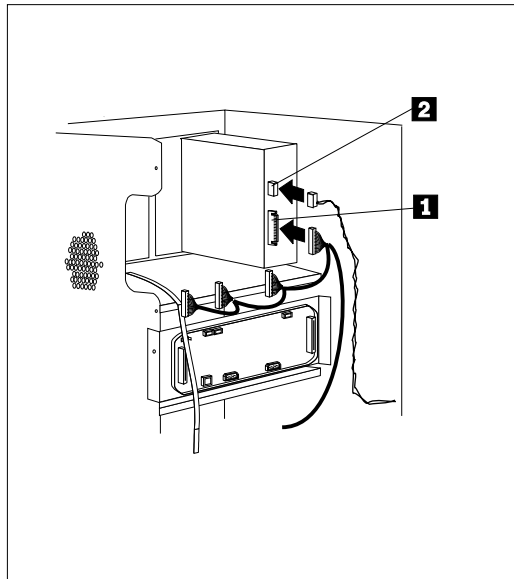
3. Slide any other installed drive forward, for easier access. If you do not have enough room to connect the cables to the new drive, remove the fan assembly:
 - a. Disconnect the fan assembly cable from the fan bracket by pressing the latch on the cable connector.

Attention: To avoid damage and ensure proper expansion enclosure operation, handle the fan assembly carefully.
 - b. Remove the two screws that hold the fan assembly in place.
 - c. Remove the fan assembly by sliding it up and pulling it out.



Installing Drives

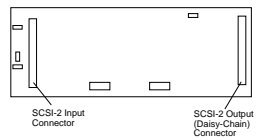
4. Connect the cables:
 - a. Attach the SCSI cable to the SCSI drive connector **1**.
(Only one SCSI cable connector is available on the drive.)
To attach a narrow (8-bit) device in bay B, use a 50-68 pin converter on a 16-bit cable. (That is, to install 8-bit devices, you need an 8-bit to 16-bit SCSI Internal Converter to connect an 8-bit device to the 16-bit cable.)
 - b. Attach the power cable connector to the 4-pin connector **2** on the drive.



- c. If you are connecting the drive to a SCSI-2 adapter in the server, insert the end of the cable through a SCSI-2 knockout panel on the rear interior wall of the expansion enclosure. You might have to remove a SCSI-2 knockout cover.

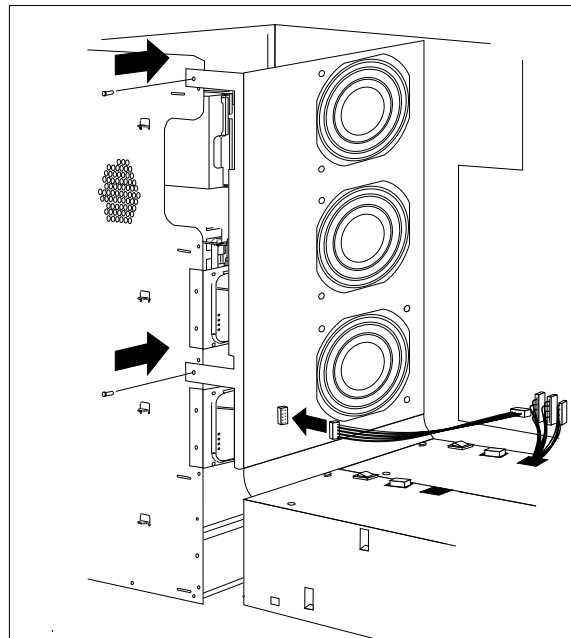
Installing Drives

- d. If you are connecting the drive in bay B to bank C or D in the expansion enclosure, attach the end of the SCSI cable to the daisy-chain connector on the backplane.



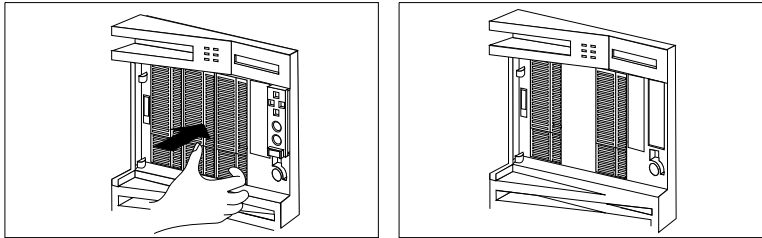
5. If you removed the fan assembly, reinstall it with the two screws that you removed in step 3 on page 38.

Reconnect the fan assembly cable.

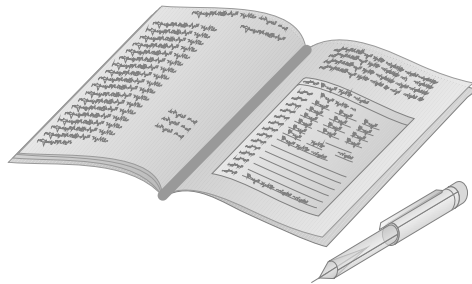


Installing Drives

6. If you installed a removable-media drive in bay B, remove the cover plate from the front cover. A cover plate (complete bezel) is in place in the expansion enclosure front cover, which you removed earlier. Remove the cover plate by pushing it, gently, out of the front cover, and store it in a safe place.



7. Go to Table 2 on page 114 to record the drive location and SCSI ID; then, return here to determine your next step.



Installing Drives

What to do next?

- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To install a drive in bank C, D, or E, go to “Installing a Drive in Bank C, D, or E” on page 66.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Preparing Bank C

Before you begin:

Be sure you have:

- Purchased a hot-swap-drive tray for each hot-swap drive that you plan to install.
- Removed the front cover and prepared the drive for installation (see “Preparing to Install Drives” on page 19 and “Preinstallation Steps (All Bays)” on page 32).

Notes:

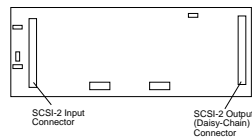
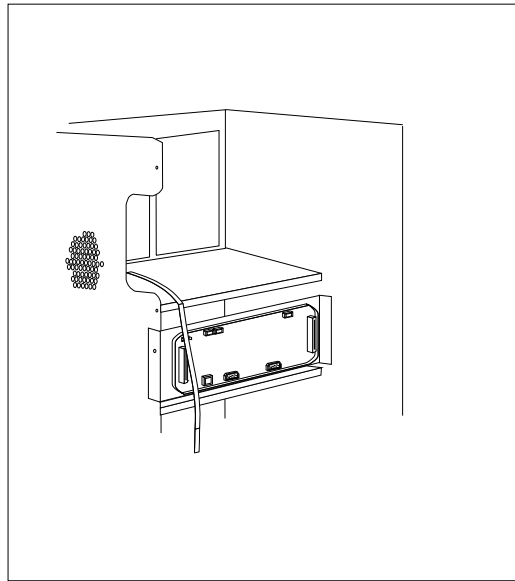
- You do not have to turn off the expansion enclosure or the server to install additional hot-swap drives in bank C. However, you must turn off the expansion enclosure and server before changing cables connected to bank C.

Attention: Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your system might lose valuable data.

- If a SCSI drive in bay B is connected to bank C, you can have up to five drives in bank C that are connected to the same SCSI cable; if two SCSI drives are in bay B, you can have only four drives in bank C. If there is no SCSI drive in bay B connected to bank C, you can have up to six drives in bank C.
- A 1-meter external SCSI cable is required between the connector on the SCSI knockout of the expansion enclosure and the external SCSI connector on the server.
- You can install up to three half-high hot-swap drive IIIs in each of banks C, D, and E.
- Ensure that a small jumper is on pins labeled “C” on jumper J2.

Installing Drives

1. If you are connecting bank C to a SCSI-2 adapter in the server, attach the SCSI cable (which connects at one end to the rear interior wall of the expansion enclosure) to the SCSI input connector on the backplane.
2. If you are connecting bank C to bank D in the expansion enclosure (daisy chaining banks C and D), attach a separately purchased SCSI cable from the SCSI-2 output (daisy chain) connector on bank C to the SCSI-2 input connector on bank D.



Installing Drives

3. Each drive that you plan to install in bank C and connect to a hot-swap backplane III must have a hot-swap drive tray III attached. If your drive has a different tray attached, remove it and attach the appropriate hot-swap drive tray III to your drive. Follow the instructions in the kit that contains the hot-swap-drive tray.
4. To install a hard disk drive in bank C, see “Installing a Drive in Bank C, D, or E” on page 66.

What to do next?

- To install an internal drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Preparing Bank D

Before you begin:

Be sure you have:

- Purchased a hot-swap drive tray III for each hot-swap drive that you plan to install.
- Removed the front cover and prepared the drive for installation (see “Preparing to Install Drives” on page 19 and “Preinstallation Steps (All Bays)” on page 32).
- Removed the cardboard packing material from bank D.

Notes:

- Before installing drives in bank D, you must contact your IBM reseller or IBM marketing representative to order an additional 220-watt power supply for you. Contact an IBM service technician to install this power supply.

You must also order a hot-swap backplane and install it at the rear of bank D. (To order the backplane, contact your IBM reseller or IBM marketing representative.)
- You might need to install an additional SCSI-2 adapter in the server. To order this adapter, contact your IBM reseller or IBM marketing representative.
- A 1-meter external SCSI cable is required between the connector on the SCSI knockout of the expansion enclosure and the external SCSI connector on the server.
- After the backplane is installed, you do not have to turn off the server to install hot-swap drives in bank D. However, you must turn off the server and expansion enclosure when performing the steps that involve installing or removing backplanes, cables, the fan assembly, and adapters.

Installing Drives

- If you have a SCSI drive in bay B, you can have up to five drives in bank D that are connected to the same SCSI cable. If there is no SCSI drive in bay B, you can install up to six drives in bank D.
- You can install up to three half-high hot-swap drive IIIs in each of banks C, D, and E.
- Ensure that a small jumper is on pins labeled “D” on jumper J2.
- Banks C and D or D and E can be daisy chained or linked together into a single SCSI-2 channel using the “daisy chain option” cable. However, the SCSI ID jumper (J12) on one backplane must be set to either HI or Reverse. (See the table under “Setting Backplane SCSI ID Jumpers (J12)” on page 82.)

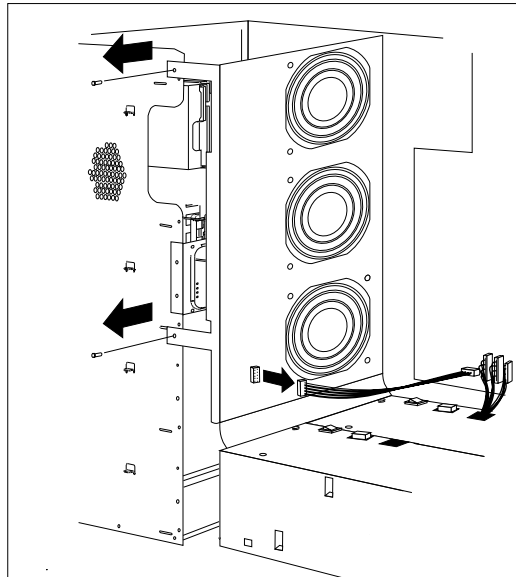
Installing Drives

If the fan assembly is installed, you must remove it before you can install the backplane in the rear of bank D.

1. Disconnect the fan assembly cable from the fan bracket by pressing the latch on the cable connector.

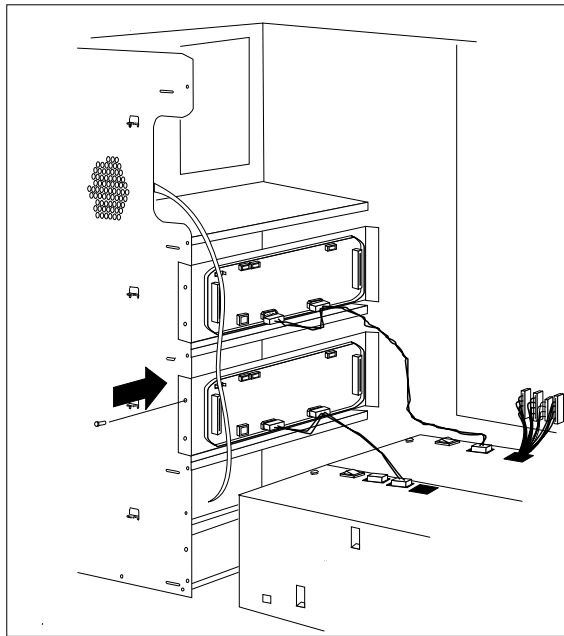
Attention: To avoid damage and ensure proper server operation, handle the fan assembly carefully.

2. Remove the two screws that hold the fan assembly in place.
3. Remove the fan assembly by sliding it up and pulling it out.



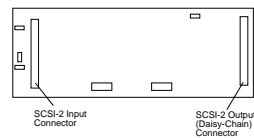
Installing Drives

4. Install a backplane at the rear of bank D:
 - a. Align the top screw hole on the left side of the backplane with the top screw hole on the left side of bank D, making sure the dimples on the backplane line up with the holes on the frame of the expansion enclosure.
 - b. Secure the backplane with one screw, as shown.

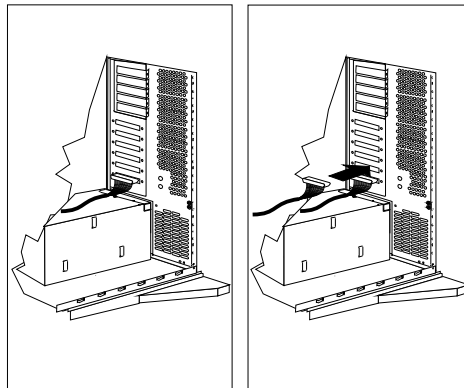


Installing Drives

The backplane hot-swap cable connectors are shown in the following illustration.

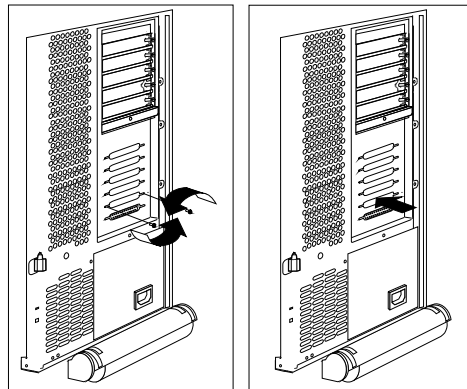


5. If you are connecting bank D to a SCSI-2 adapter in the server, attach the SCSI cable between the SCSI input connector on the backplane and the rear wall of the expansion enclosure. (You might have to remove a SCSI-2 knockout panel.)



- a. To remove a knockout panel, remove the screws from the SCSI-2 knockout connector panel, located on the rear of the expansion enclosure.

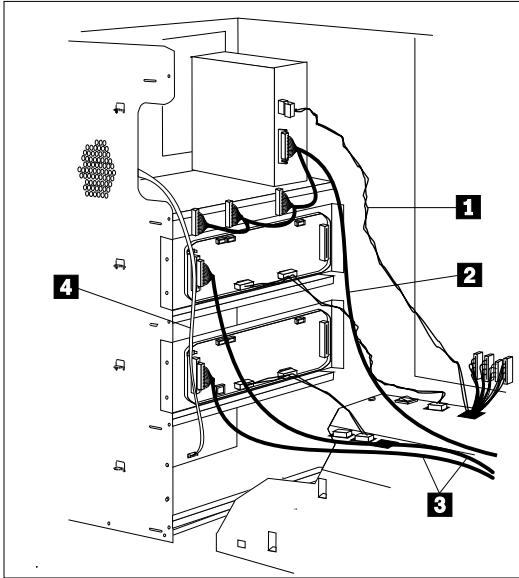
Installing Drives



- b. Store the screws and the panel in a safe place.
6. If you are connecting bank C serially to bank D in the expansion enclosure (daisy-chaining banks C and D), attach a SCSI-2 cable from the daisy-chain connector on bank C to the SCSI-2 connector on bank D.
Note: Bank C can connect to *either* bay B or to the backplane in bank D. If bank C is connected to bay B, it *cannot* be connected to bank D.
7. You might need to install an additional SCSI-2 adapter in the server. Refer to your server documentation for installation instructions; then continue with step 9.
8. Attach the three-drop system status cable to the backplane in bank D (connector J1).
9. Attach the two-drop power cable to both of the power connectors on the backplane in bank D.
10. Refer to the following diagrams to help you connect the cables properly. (For clarity and to avoid clutter, these diagrams do not necessarily show every exact detail.)

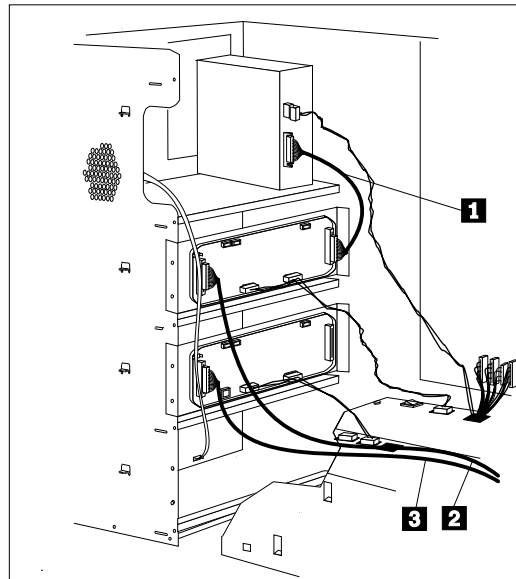
This view (1 of 4) shows two SCSI-2 cables connecting bank C and bank D to two SCSI-2 adapters in the server **3**. A 4-drop cable **2** connects the drive in bay B to an adapter in the server. A power cable **1** connects the drive in bay B to the power supply. A system-status cable **4** connects to banks C and D.

Installing Drives



Installing Drives

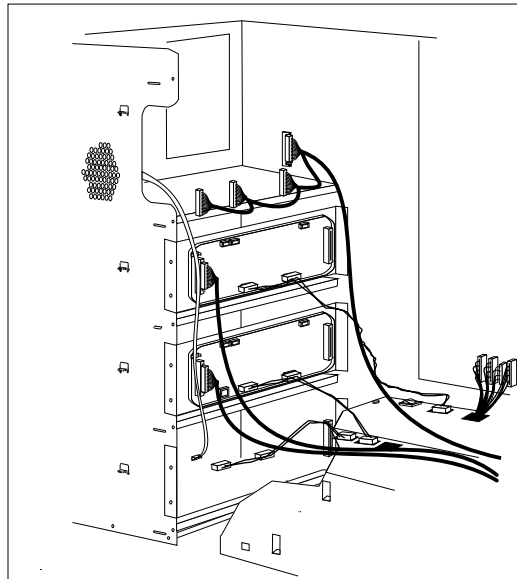
- This view (2 of 4) shows a cable (such as a 2-drop bay B SCSI cable) routing from a drive in bay B to the daisy-chain connector in bank C **1**. An internal SCSI cable **2** goes from the SCSI-2 connector in bank C to an adapter in the server. A separate cable from the SCSI connector on the backplane in bank D connects to a second adapter in the server **3**. A system status cable connects to the backplanes in bank C and bank D.



Note: Bank C can contain up to five drives.

Installing Drives

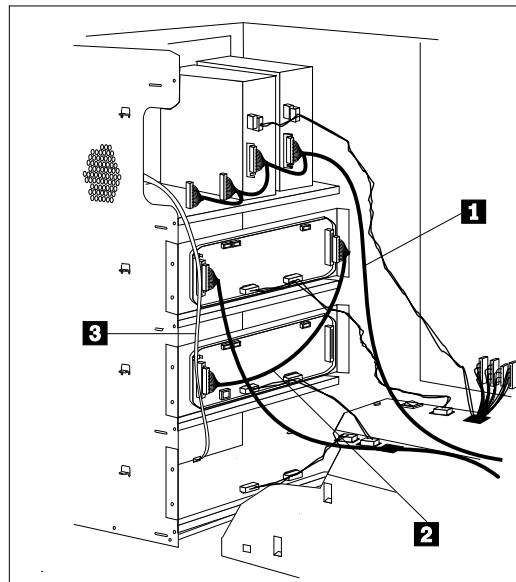
- This view (3 of 4) shows the cable routing in an expansion enclosure with drives in banks C and D, and bay B empty. A three-drop system status cable is connected to the backplanes in banks C and D.



Note: Separate SCSI cables connect banks C and D to two adapters in the server.

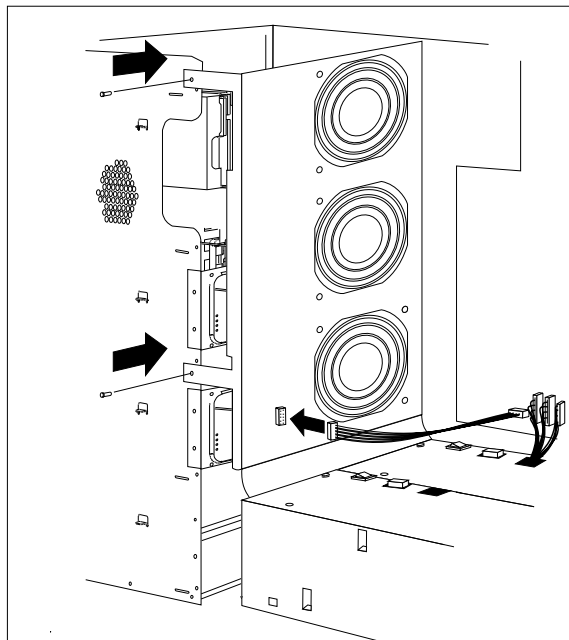
Installing Drives

- This view (4 of 4) shows the cable routing in an expansion enclosure with two tape drives in bay B, connected by a separate SCSI cable **1** to an adapter in the server. Banks C and D are daisy-chained **2**, and contain three half-high drives each. A system status cable **3** connects to the backplanes in banks C and D.



Installing Drives

11. Reinstall the fan assembly that you removed in step 3 on page 48.
12. Reinstall the fan assembly screws that you removed in step 2 on page 48.
13. Reconnect the fan assembly cable that you disconnected in step 1 on page 48.



Installing Drives

What to do next?

- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To install a hot-swap drive, see “Installing a Drive in Bank C, D, or E” on page 66.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Preparing Bank E

Before you begin:

Be sure you have:

- Purchased a hot-swap drive tray III for each hot-swap drive that you plan to install.
- Removed the front cover and prepared the drive for installation (see “Preparing to Install Drives” on page 19 and “Preinstallation Steps (All Bays)” on page 32).
- Removed the cardboard packing material from bank E.
- Contacted your IBM service technician to have an additional power supply installed (if it hasn't already been installed for bank D).

Notes:

- Before installing drives in bank E, you must contact an IBM service technician to install an additional 220-watt power supply if it hasn't already been installed for bank D.

You must also order a hot-swap backplane III and install it at the rear of bank E. (To order the backplane, contact your IBM reseller or IBM marketing representative.)

- You might need to install an additional SCSI-2 adapter in the server. (See your server documentation for information.)
- A 1-meter external SCSI cable is required between the connector on the SCSI knockout of the expansion enclosure and the external SCSI connector on the server.

Installing Drives

- After the backplane is completely installed, you do not have to turn off the server and expansion enclosure to install hot-swap drives in bank E. However, you must turn them off when performing the steps that involve installing or removing adapters, backplanes, cables, and the fan assembly.
- Ensure that a small jumper is on pins labeled “E” on jumper J2.
- Banks C and D or D and E can be daisy chained or linked together into a single SCSI-2 channel using the “daisy chain option” cable. However, the SCSI ID jumper (J12) on one backplane must be set to either HI or Reverse. (See the table under “Setting Backplane SCSI ID Jumpers (J12)” on page 82.)

Installing Drives

1. If required, install an additional SCSI-2 adapter in one of the empty expansion slots in your server (see your server documentation).

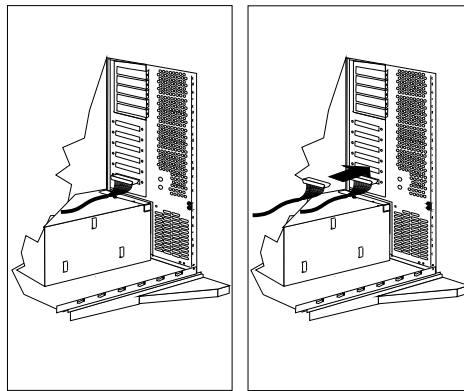
If the fan assembly is installed, you must remove it before you can install the backplane at the rear of bank E.

2. Disconnect the fan assembly cable from the fan bracket by pressing the latch on the cable connector.

Remove the two screws that hold the fan assembly in place. Remove the fan assembly. (See steps 1 through 3 on page 48).

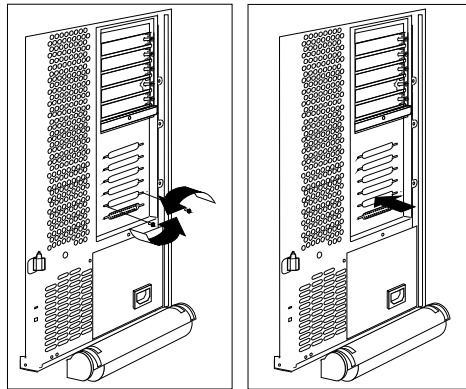
Attention: To avoid damage and ensure proper server operation, handle the fan assembly carefully.

3. Install the backplane at the rear of bank E (see step 4 on page 49).
4. Attach a power cable from the additional power supply to the backplane.
5. If you are connecting bank E to a SCSI-2 adapter in the server, attach a SCSI-2 cable to the SCSI-2 connector on the rear interior wall of the expansion enclosure. (You might have to remove a SCSI-2 knockout panel.)



Installing Drives

- a. To remove a knockout panel, remove the screws from the SCSI-2 knockout connector panel located on the rear of the expansion enclosure.



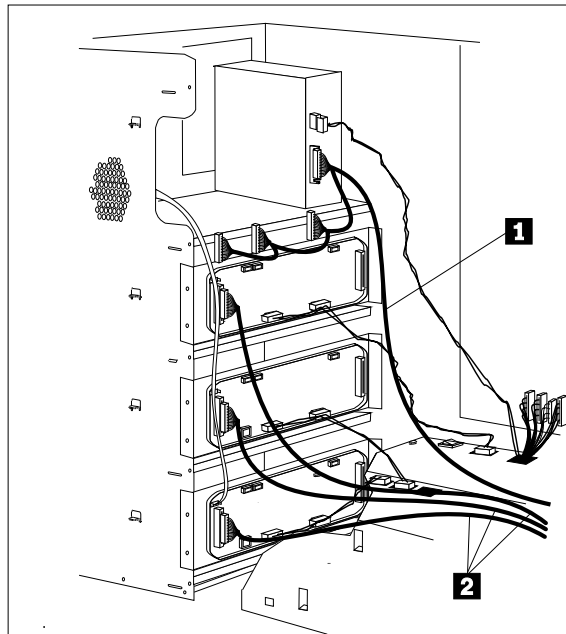
- b. Store the screws and the panel in a safe place.
6. If you are connecting bank D serially to bank E (daisy-chaining banks D and E):
 - Set the SCSI ID jumper (J12) on one backplane to either HI or Reverse (see “Setting Backplane SCSI ID Jumpers (J12)” on page 82).
 - Attach a SCSI-2 internal cable from the output (daisy-chain) connector on bank D to the SCSI-2 input connector on bank E.

Installing Drives

7. Refer to the following diagrams to help you connect the cables properly.

- This view (1 of 2) shows an expansion enclosure with four separate cables connected to SCSI-2 adapters in the server.

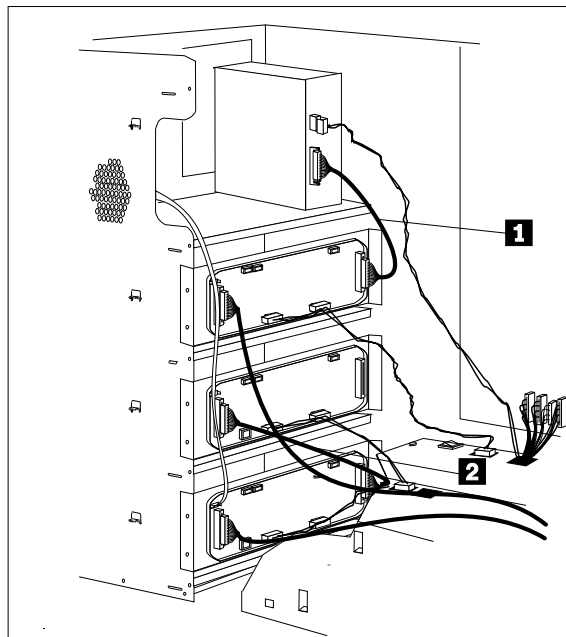
An optional, 4-drop cable **1** connects bay B to a SCSI connector knockout on the internal rear wall of the expansion enclosure. Internal SCSI-2 cables **2** connect the SCSI connector on the backplane in banks C, D, and E to a SCSI connector knockout on the internal rear wall of the expansion enclosure. A system status cable connects to the backplanes in banks C, D, and E.



Installing Drives

- This view (2 of 2) shows an expansion enclosure, with two separate cables connected to SCSI-2 adapters in the server.

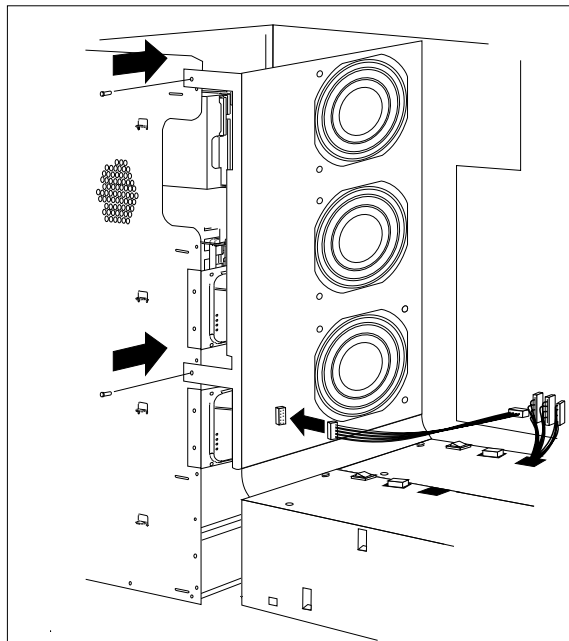
An optional, 2-drop cable **1** connects Bay B to the backplane in bank C. An internal SCSI cable **2** connects the SCSI-2 connector on the backplane in bank D to the output (daisy-chain) connector on the backplane in bank E. An internal SCSI cable connects the SCSI connector on the backplane in bank C to a SCSI connector knockout on the internal rear wall of the expansion enclosure. A system status cable connects to the backplane in bank C, D, and E.



Note: A SCSI-2 cable connects the daisy-chained drives to the external connector on an adapter in the server.

Installing Drives

8. Reinstall the fan assembly that you removed in step 2 on page 60 (see step 11 on page 56).
9. Reinstall the screws that you removed in step 2 on page 60.
10. Reconnect the fan assembly cable that you disconnected in step 2 on page 60.



11. To install a hot-swap drive, see “Installing a Drive in Bank C, D, or E” on page 66.

Installing Drives

What to do next?

- To install an internal drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Installing a Drive in Bank C, D, or E

Before you begin:

Be sure you have:

- Purchased a hot-swap drive tray III for each hot-swap drive that you plan to install.
- Removed the front cover and prepared the drive for installation (see “Preparing to Install Drives” on page 19 and “Preinstallation Steps (All Bays)” on page 32).
- Installed or added the appropriate cables and backplanes. If this is the first time you are installing a drive in a bank, see “What to do next?” on page 70 to find the specific instructions.

Notes:

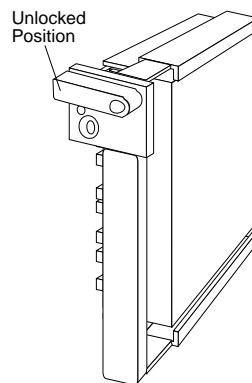
- You do not have to turn off the expansion enclosure or the server to install additional hot-swap drives in bank C. However, you must turn off the expansion enclosure before changing cables connected to bank C.

Attention: Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your system might lose valuable data.

- If you have a SCSI drive in bay B, you can have up to five drives in bank C or bank D that are connected to the same SCSI cable. If there is no SCSI drive in bay B, you can have up to six drives in bank C or bank D.
- You can install up to three half-high hot-swap drives in each of the three hot-swap banks.
- If you are installing drives in a bank that is daisy-chained to another bank, the SCSI ID jumper must be set properly to avoid conflicts. See “Changing Jumper Settings” on page 80 for more information.

Installing Drives

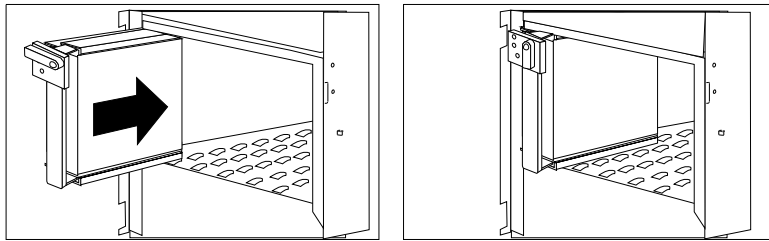
1. Each drive that you plan to install in banks C, D, and E and connect to a hot-swap backplane III must have a hot-swap drive tray III attached. If your drive has a different tray attached, remove it and attach the appropriate hot-swap drive tray III to your drive. Follow the instructions in the kit that contains the hot-swap drive tray.
2. Install the hard disk drive:
 - a. Move the tray knob to the unlocked position.



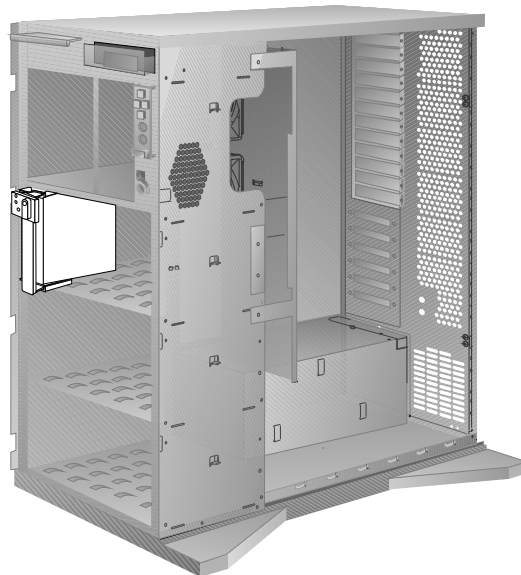
- b. Position the drive tray assembly vertically, with the connector facing the rear of the server.

Installing Drives

- c. Align the side of the tray with the raised guides on the bottom of the bay. (Note the arrows pointing towards the backs of the bays.)

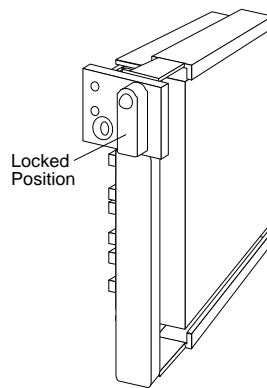


- d. Slide the drive tray to the rear of the bay until it connects to the backplane. Be sure it is connected securely to the backplane.



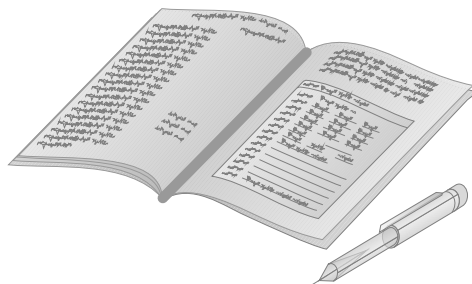
Installing Drives

- e. Move the tray knob to the locked position.



Note: If you turned on the expansion enclosure before installing the drive, the green light on the front of the drive tray illuminates, indicating that the drive was installed correctly.

3. Go to Table 2 on page 114 to record the drive location and the SCSI ID assigned to the drive (see “SCSI Drives” on page 29 for details); then, return here to determine your next step.



Note: If your server is a disk-array model, you must reconfigure your disk arrays after you install hard disk drives. See your server documentation for details.

Installing Drives

What to do next?

- To install an internal drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Removing Drives

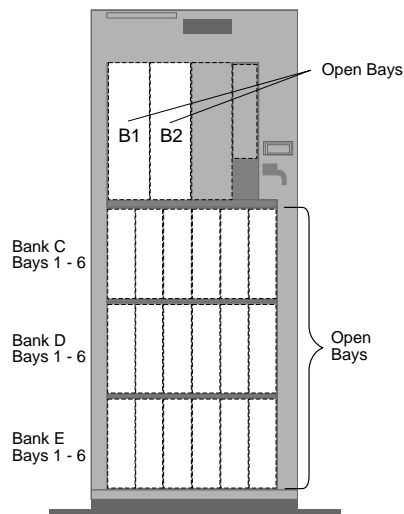
Before you begin:

Be sure you have:

- Read “Electrical Safety” on page 17 and “Handling Static-Sensitive Devices” on page 18.
- Removed the front and side covers (see “Preparing to Install Drives” on page 19).
- Determined the correct location of a failed hard disk drive.

To remove a drive from bay B, go to “Removing a Drive from Bay B” on page 72.

To remove a drive from bank C, D, or E, go to “Removing a Drive from Bank C, D, or E” on page 75.



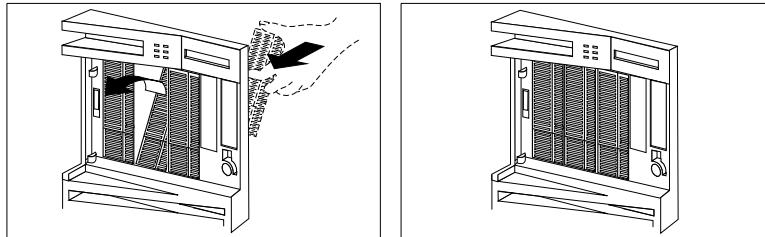
Removing Drives

Removing a Drive from Bay B

Note: To locate bay B, see the illustration on page 71.

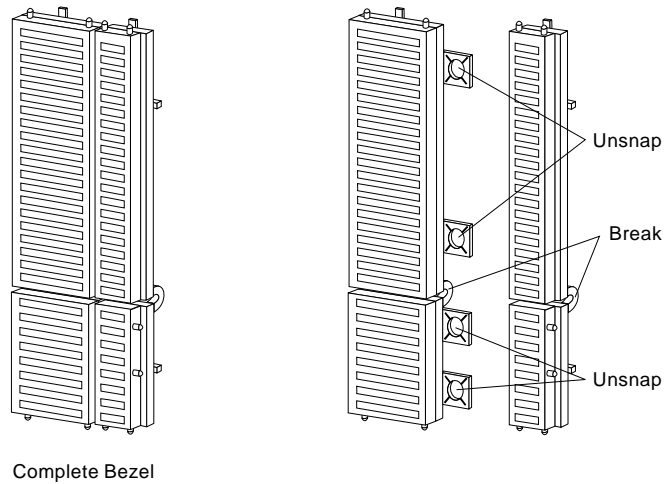
To remove a drive from bay B, do the following:

1. Find the drive that you plan to remove.
2. Slide the drive halfway out of the front of the bay.
3. Disconnect the appropriate cables from the back of the drive.
4. Remove the drive from the bay. Store the drive in a safe place.
5. If you removed a removable-media drive from bay B, replace the cover plate in the front cover. A cover plate (complete bezel) was removed from the expansion enclosure front cover when you installed the drive. Insert the cover plate by pushing it, gently, into the front cover.



Removing Drives

6. You can adjust the size of the cover plate as shown, and then press the cover plate into place in the front cover.



7. Go to Table 2 on page 114 and update the drive information; then, return here to determine your next step.



Removing Drives

What to do next?

- To remove another internal drive from bay B, return to step 1 on page 72.
- To install another internal drive in bay B, go to step 1 on page 33.
- To remove an internal drive from bank C, D, or E, go to “Removing a Drive from Bank C, D, or E” on page 75.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Removing a Drive from Bank C, D, or E

Notes:

- To locate banks C, D, and E, see the illustration on page 71.
- You do not have to turn off the server or expansion enclosure to remove a drive from banks C, D, and E in the expansion enclosure.

Hot-swap drives have two lights on the front of the tray that contains the drive. If the drive has a good electrical connection upon installation, the green light illuminates.

The following table summarizes the LED states and their meanings.

Green	Amber	Description
On	Off	Drive tray is powered on; the hard disk drive is inactive; and the drive should <i>not</i> be removed.
Blinking	Off	The hard disk drive is inactive. The hot-swap drive can be removed safely.
On	On or Blinking	The hard disk drive is in use, and should <i>not</i> be removed.
Off	Off	The drive is defective, or no power is being supplied to the drive. The hot-swap drive can be removed safely.

Attention: Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your server might lose valuable data.

Thoroughly review the information that appears on your server display to determine the location of the failed drive.

If you partially or completely remove a good drive instead of the defective one, your server might lose valuable data. This situation is especially relevant if you assigned RAID level 1 or 5 to the logical drives in your disk array. However, the RAID controller can rebuild the data that you need, provided that certain conditions are met. See your server documentation for further details.

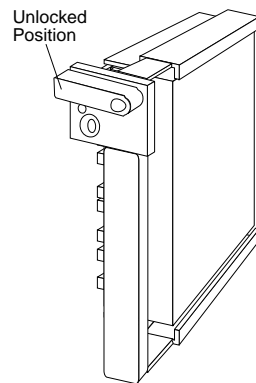
Removing Drives

To remove a drive from bank C, D, or E, do the following steps:

1. Find the defective drive that you plan to remove.
2. Ensure that you have selected the correct drive for removal.

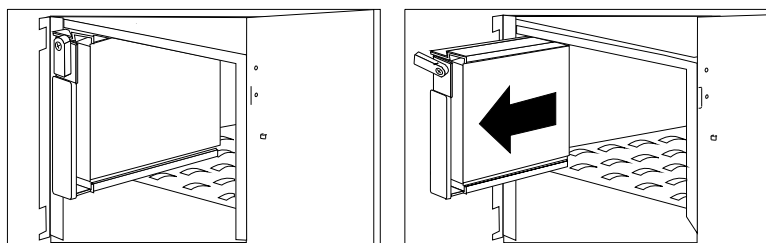
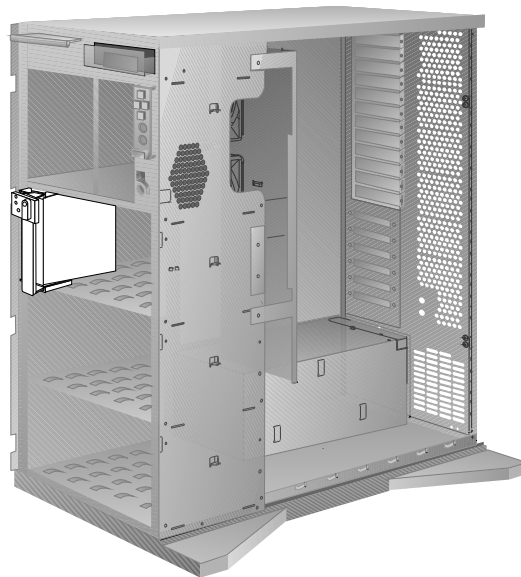
Attention: Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your server might lose valuable data.

3. Press the power-off switch on the drive tray. When the green LED begins to blink, it is safe to remove the drive.
4. Unlock the drive by turning the knob clockwise 90 degrees.



Removing Drives

5. Disconnect the drive from the connector on the backplane by grasping the handle on the drive tray and pulling the drive out of the server. Store the drive in a safe place.



Note: If your server is a disk-array model, you must reconfigure your disk arrays after you remove hard disk drives. See your server documentation for details.

Removing Drives

6. What to do next?
 - If you are removing another internal drive, return to step 1 on page 76.
 - If you are installing another internal drive in bank C, D, or E, slide the drive vertically into the target bay until it connects to the backplane, and move the knob on the drive tray to the locked position. If you need details about installing an internal drive, refer to “Installing a Drive in Bank C, D, or E” on page 66.
 - If you are not installing or removing another internal drive, continue with the next step.
7. Go to Table 2 on page 114 and update the drive information; then, return here to determine your next step.



Removing Drives

What to do next?

- To install an internal drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To set a jumper, go to “Changing Jumper Settings” on page 80.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

Changing Jumper Settings

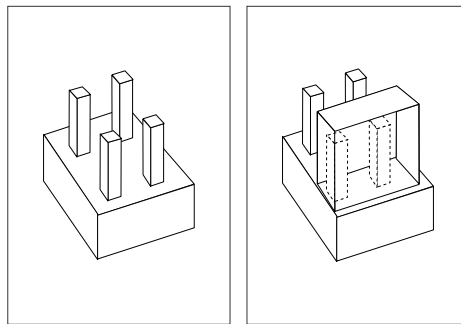
Changing Jumper Settings

The backplane jumper settings appear on a label inside your expansion enclosure. You will see the label when you remove the covers. If you need to change them, use the following instructions. The jumper values are preset. (To remove the covers, go to “Preparing to Install Drives” on page 19.)

How to Set Jumpers

A jumper covers pins on a pin block. The jumper setting depends on which pins are covered.

Jumper positions are indicated on the backplane with the jumper location identifier, for example J12. The following illustration shows a jumper on a two-pin block being added. The orientation and labels for the jumpers on your system board might be different from those shown here.



To change a jumper setting:

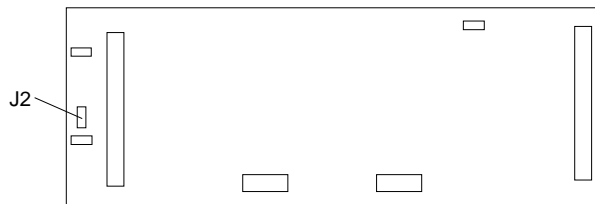
1. Lift the jumper straight up off the pin block.
2. Slide the jumper down over the correct pins.

Changing Jumper Settings

Setting the Backplane Address Jumper (J2)

If more than one backplane is installed in your expansion enclosure, each backplane address jumper must have a unique setting. This setting identifies the backplane's location within the expansion enclosure and ensures proper enclosure operation.

Locate the three-pin address jumper (J2) on the back of the backplane as shown in the following figure; then read the table to determine the setting for your configuration. Note that the jumper positions C, D, and E are marked on the backplane.



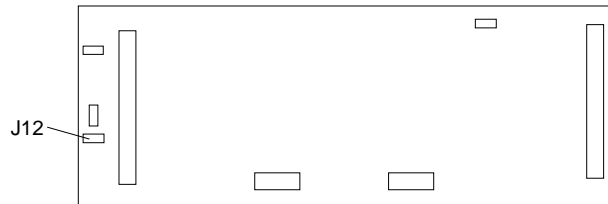
Jumper Position	Description
E	Address for a backplane installed in Bank E
D	Address for a backplane installed in Bank D
C	Address for a backplane installed in Bank C

Changing Jumper Settings

Setting Backplane SCSI ID Jumpers (J12)

The SCSI ID address jumper, a pin block with four pairs of pins (J12), is located on the rear of the backplanes in banks C, D, and E. When two backplanes are daisy-chained in your expansion enclosure, the first backplane address jumper (for example, Bank C) must be set to LO, defining the SCSI IDs as 0 through 5. The second backplane (in this example, bank D) must be set to either Reverse, defining the SCSI IDs as 5 through 0, or HI, defining the SCSI IDs as 8 through D. The default, no jumper installed, is to set the addresses to LO.

If the SCSI adapter supports more than eight SCSI devices per SCSI channel, the second backplane can be set to either HI or Reverse. However, if the SCSI adapter supports eight or fewer SCSI devices per channel, the second backplane must be set to reverse.



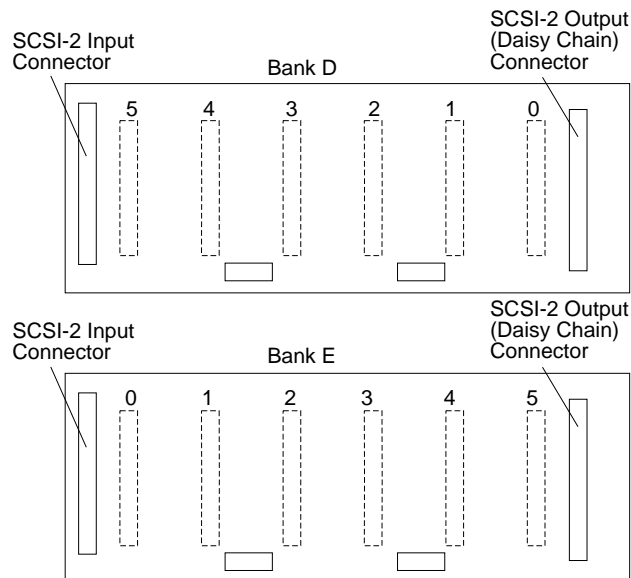
The following table summarizes the jumper settings for the SCSI ID jumper (J12).

Jumper Position	Description																
J12 <table style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>4</td><td>6</td><td>8</td></tr> <tr><td>•</td><td>•</td><td>•</td><td>•</td></tr> <tr><td>•</td><td>•</td><td>•</td><td>•</td></tr> <tr><td>1</td><td>3</td><td>5</td><td>7</td></tr> </table> LO	2	4	6	8	•	•	•	•	•	•	•	•	1	3	5	7	Sets SCSI IDs to Lo, starting from 0 (bay 1) to 5 (bay 6)
2	4	6	8														
•	•	•	•														
•	•	•	•														
1	3	5	7														
J12 <table style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>4</td><td>6</td><td>8</td></tr> <tr><td>•</td><td>•</td><td>■</td><td>•</td></tr> <tr><td>•</td><td>•</td><td>•</td><td>•</td></tr> <tr><td>1</td><td>3</td><td>5</td><td>7</td></tr> </table> REV	2	4	6	8	•	•	■	•	•	•	•	•	1	3	5	7	Sets SCSI IDs to Reverse, starting from 5 (bay 1) to 0 (bay 6)
2	4	6	8														
•	•	■	•														
•	•	•	•														
1	3	5	7														
J12 <table style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>4</td><td>6</td><td>8</td></tr> <tr><td>•</td><td>•</td><td>■</td><td>•</td></tr> <tr><td>•</td><td>•</td><td>•</td><td>•</td></tr> <tr><td>1</td><td>3</td><td>5</td><td>7</td></tr> </table> HI	2	4	6	8	•	•	■	•	•	•	•	•	1	3	5	7	Sets SCSI IDs to high (SCSI IDs 8 to D)
2	4	6	8														
•	•	■	•														
•	•	•	•														
1	3	5	7														

Changing Jumper Settings

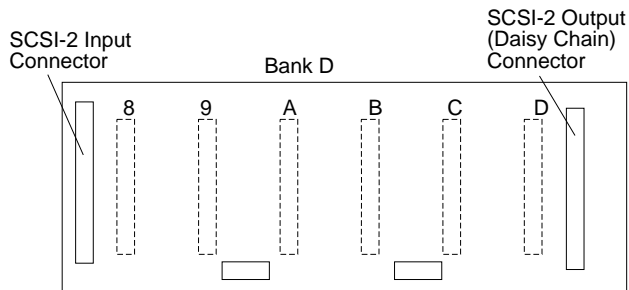
For example, suppose you install three half-high drives in both banks D and E. Before you connect the banks with a daisy-chain cable, you must set the SCSI ID jumper (J12) on bank D to either HI or Reverse.

The following illustration shows the backs of the backplanes. Drive connectors on the front of the backplane are indicated with dotted lines. Each half-high drive occupies two bays in the bank. The SCSI connector on the drive tray into the first connector (the connector on the left). In the following illustration, the drives in bank E thus connect to connectors 0, 2, and 4. Because the jumper on the backplane in bank D is set to Reverse, the drives in bank D connect to connectors 5, 3, and 1.



In the following illustration, the jumper on backplane D is set to HI. The half-high drives in Bank D will have addresses 8, A, and C.

Changing Jumper Settings



SCSI devices may also have jumpers. The jumpers on the devices must be removed when the devices are placed in hot-swap trays. For more information, see “SCSI IDs” on page 31.

Changing Jumper Settings

What to do next?

- To install an internal drive in bay B, go to “Installing a Drive in Bay B” on page 35.
- To install an internal drive in banks C, D, and E, go to “Installing a Drive in Bank C, D, or E” on page 66.
- To add or change cables in bank C, go to “Preparing Bank C” on page 43.
- To install the backplane and cables in bank D, go to “Preparing Bank D” on page 46.
- To install the backplane and cables in bank E, go to “Preparing Bank E” on page 58.
- To remove an internal drive, go to “Removing Drives” on page 71.
- To install or remove a security feature, go to “Security Procedures” on page 86.
- If you have no internal devices to install or remove, go to “Completing the Installation” on page 90.

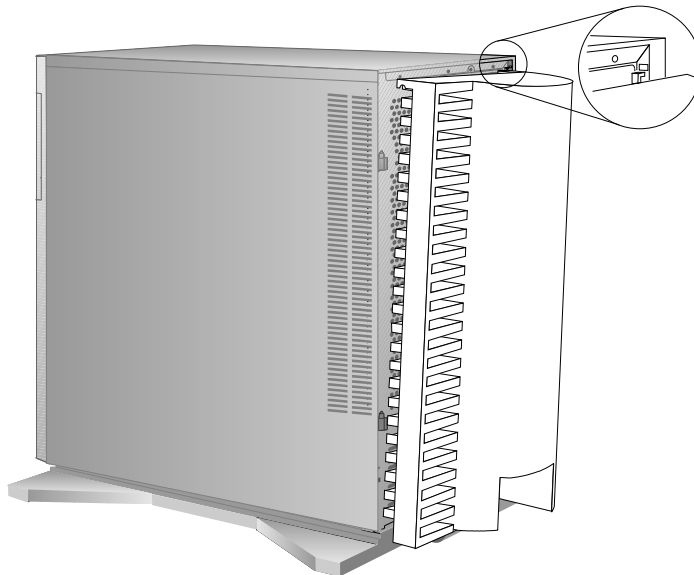
Security Procedures

Security Procedures

Your expansion enclosure is equipped with security features to help prevent theft or unauthorized use of your expansion enclosure.

Security-Cover Option

For additional security, you might want to control access to the cables and cable connectors on your expansion enclosure. The optional IBM PC Server Security Cover restricts cable access while creating a sleek, streamlined profile. Instructions for installing this option are in a separate booklet that comes with the security-cover option. If you want to purchase this option, contact your IBM reseller or IBM marketing representative for additional information.



Installing a U-Bolt

Before you begin:

Be sure you have:

- Obtained a 19 mm (3/4 in.) U-bolt or wire rope (similar to National Manufacturing No. 3230, STK No. 176-735).
- Obtained a security cable.
- Obtained a lock, such as a combination lock or padlock.
- Read “Electrical Safety” on page 17 and “Handling Static-Sensitive Devices” on page 18.
- Removed the expansion enclosure side cover (see “Preparing to Install Drives” on page 19).

Your expansion enclosure contains two holes in the rear panel for installing an optional U-bolt. The U-bolt can be used to attach a security cable so that you can secure your expansion enclosure to a stationary object.

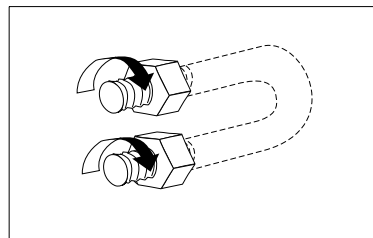
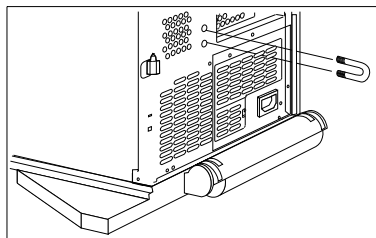
Security Procedures

To install the U-bolt in the expansion enclosure:

1. Install the U-bolt:
 - a. Locate the two holes for the U-bolt in the rear panel of the expansion enclosure.

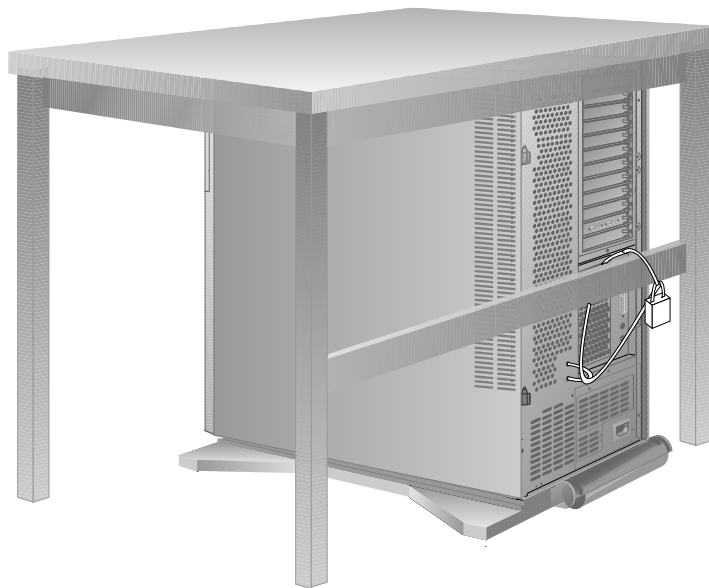


- b. Insert the U-bolt through the holes and secure it in place with the nuts.
2. Reinstall the expansion enclosure side and front covers, and attach the cables (see “Completing the Installation” on page 90).



Security Procedures

3. Insert the security cable through the U-bolt. Loop the cable around (or through) an object from which it cannot be removed; then, fasten the cable ends together with the lock.

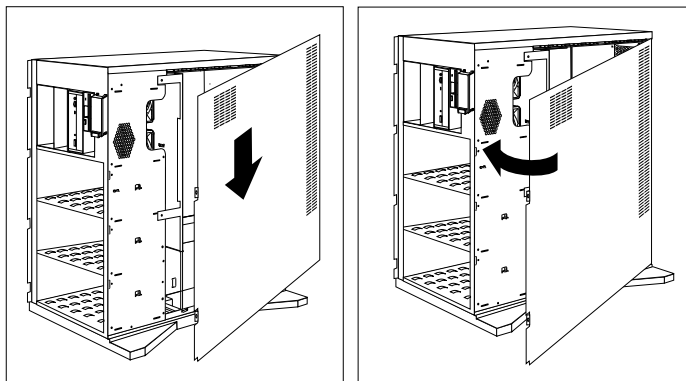


Completing the Installation

Completing the Installation

When you have finished installing options, follow these instructions to complete the installation.

1. Reinstall the side cover:
 - a. Align the pins on the rear of the side cover with the two hinges on the rear of the expansion enclosure. Open the side cover to a 90-degree angle.
 - b. Slide the side cover down.
 - c. Push the side cover to close it.

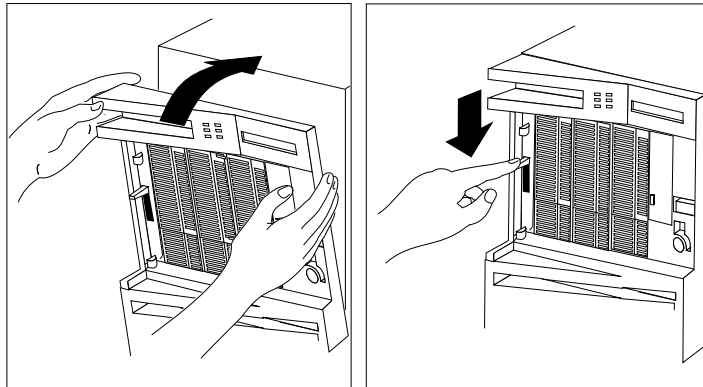


Completing the Installation

2. Reinstall the front cover:

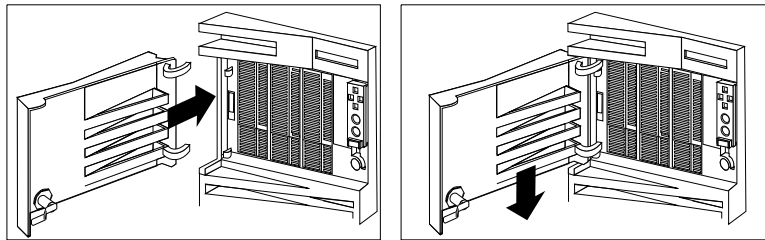
Note: Before installing the front cover, verify that the side cover is installed correctly. If the side cover is not properly installed, the front cover will not align correctly when you attempt to install it.

- a. Align the bottom of the front cover with the bottom of the server.
- b. Fit the front-cover bottom hooks into the grooves that are located on the bottom of the expansion enclosure.
- c. Pivot the front cover upward and press the top of the cover into the top of the expansion enclosure until they snap together; then, snap the latch down from the recessed area.



Completing the Installation

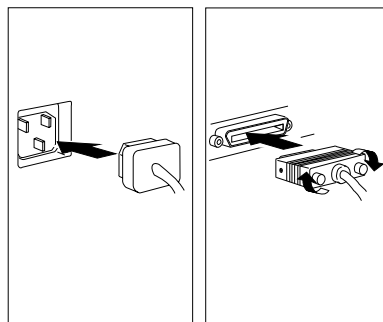
3. Reinstall the door at the front of the expansion enclosure by aligning the pins with the hinges, and sliding the door down.



4. Close and lock the door.

Attention: Be sure to maintain a clearance of at least 51 mm (2 inches) on all sides of the expansion enclosure to allow for air circulation.

5. Connect all cables to the back of the expansion enclosure. Connect SCSI-2 cables to external SCSI-2 connectors on the server; then plug all power cords into properly grounded electrical outlets.



What to do next?

- If you installed options during the initial setup of your expansion enclosure, go to your server documentation to complete the installation procedure.
- If you installed hot-swap drives, you might need to update your server configuration parameters. If you have a disk-array model, refer to your server documentation for information on RAID configuration information and server configuration for additional details. If you have a non-disk-array model, refer to the chapter on server configuration if you need to configure your server.
- Refer to the instructions that came with options that you installed to see if device drivers are required and how to install them.) If you don't need to install any device drivers or configure the system, your expansion enclosure is ready to use with the server.

Chapter 3. Solving Problems

This chapter contains information to help you solve some of the simpler problems you might have with your IBM PC Server Enterprise Expansion Enclosure.

This chapter contains:

Getting Started	95
Overview of the Diagnostic Tools	96
Power-On Self-Test (POST)	96
Troubleshooting Charts	97
Checking the Expansion Tower for Damage	100
After Dropping It	100
After Spilling Liquid on It	100
Getting Help, Service, and Information	101
Solving Problems	101
Using the HelpWare Support Family	101
Purchasing Additional HelpWare Services	105
Obtaining IBM Operating System Updates	109
Ordering System Diskettes	109
Ordering Publications	109

Getting Started

If you are not familiar with the diagnostic tools and programs, continue reading this chapter. For more information about a hardware failure or a message on the information panel, go to “Troubleshooting Charts” on page 97.

Overview of the Diagnostic Tools

System problems can be caused by hardware, software, or user error. (An example of a user error is pressing the wrong key.) You might be able to solve the problem yourself or provide helpful information to a service technician.

The following tools are available to help you identify and resolve hardware-related problems in the expansion enclosure:

- Power-on self-test (POST)
- Troubleshooting charts (with error messages)

See your server documentation for more detailed information on testing and diagnostic tools.

Power-On Self-Test (POST)

Each time you turn on the expansion enclosure, it performs a series of tests called the *power-on self-test*, or *POST*. If the tests indicate a problem, a message appears on the information panel.

Troubleshooting Charts

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms, including displayed error messages.

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column of the chart.

In some cases, pressing the Enter button clears the error condition.

Problem Symptoms and Error Messages	Description and Resolution
Expansion tower does not come on	<p>There may be a problem with your electrical power source or the connectors to it.</p> <p><i>Action:</i> Make sure that:</p> <ol style="list-style-type: none">1. Power cords or cables are properly plugged in or connected;2. Expansion tower is properly enabled and powered on;3. Electrical power source is active. <p>If the problem persists, have the system serviced.</p>
Blank information panel	<p>If the Power OK indicator is on and the fans are running, operation will probably not be affected. You can continue to use the expansion enclosure; but note that no diagnostic messages will be displayed.</p> <p><i>Action:</i> Have the system serviced.</p>
Expansion tower powers on, displays E700 AC Failure.	<p>Power was lost while the expansion enclosure was running. This error is displayed the next time the expansion enclosure is powered on.</p> <p><i>Action:</i> Press the Enter button on the front panel to clear the error message from the information panel. There may be a problem with the power supply. If the problem persists, have the system serviced.</p>

Troubleshooting Charts

Problem Symptoms and Error Messages	Description and Resolution
Expansion tower powers on, displays E702 5V Failure.	<p>The System 5V input reads out of specification. If the voltage is too low, a recoverable error is written to the information panel. If the voltage is too high, the expansion enclosure shuts down. The message displays on the information panel the next time the expansion enclosure is turned on. There is a problem with the power supply or system board.</p> <p><i>Action:</i> Press the Enter button on the front panel to clear the error message from the information panel. Check for a problem with:</p> <ol style="list-style-type: none">1. The voltage being supplied to the expansion enclosure. (Refer to “Specifications” on page 3 for the voltage specifications.)2. System board <p>If the problem persists, have the system serviced.</p>
Expansion tower powers on, displays E703 12V Failure.	<p>The System 12V input reads out of specification. If the voltage is too low, a recoverable error is written to the information panel. If the voltage is too high, the expansion enclosure shuts down. The message displays on the information panel the next time the expansion enclosure is turned on.</p> <p><i>Action:</i> Press the Enter button on the front panel to clear the error message from the information panel. Check for a problem with:</p> <ol style="list-style-type: none">1. The voltage being supplied to the expansion enclosure. (Refer to “Specifications” on page 3 for the voltage specifications.)2. System board <p>If the problem persists, have the system serviced.</p>
Expansion tower powers on, information panel displays E704 Fan Failure.	<p>One or more fans failed. If more than one fan remains idle, the expansion enclosure shuts down after approximately 30 seconds.</p> <p><i>Action:</i> Press the Enter button on the front panel to clear the error message from the information panel. Following an irrecoverable error, check for a problem with:</p> <ol style="list-style-type: none">1. Fan2. System board <p>If the problem persists, have the system serviced.</p>

Troubleshooting Charts

Note: If you cannot find the problem in the troubleshooting charts, go to your server documentation to test the entire system. If you already have run the server's test program, or if running the test does not reveal the problem, have the system serviced. (Refer to "Getting Help, Service, and Information" on page 101.)

Checking the Expansion Tower for Damage

Checking the Expansion Tower for Damage

This section provides instructions on what to do if your expansion enclosure is damaged.

After Dropping It

Obvious damage:

Look for loose cables and obvious damage. If any cables are loose, reconnect them securely. If there is obvious damage to the expansion enclosure, have it serviced.

No obvious damage:

If you see no damage, turn on the expansion enclosure. If it works correctly, the system probably did not suffer any damage.

CAUTION:

Observe all safety and electrostatic precautions listed in “Safety Information” on page v to avoid personal injury or damage to your expansion enclosure.

If the expansion enclosure does not work correctly, turn it off and check the cables and drives to ensure that they are seated correctly. See Chapter 2, “Installing and Removing Drives” on page 15 and follow the instructions for opening your system; then, reseal all cables and drives.

If the system still does not work correctly, start the server's test programs and test the expansion enclosure. See the server documentation for instructions.

After Spilling Liquid on It

If liquid gets inside the expansion enclosure:

1. Turn off the expansion enclosure and all attached devices.
2. Disconnect the expansion enclosure from the server.
3. Unplug the expansion enclosure from the electrical outlet and all attached devices.
4. Try to dry the liquid off the expansion enclosure.
5. Have the expansion enclosure serviced immediately.

Getting Help, Service, and Information

If you need help, service, 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 provides information about those sources.

Services available and telephone numbers listed are subject to change without notice.

Solving Problems

Many problems can be solved without outside assistance, by using the online help or by looking in the online or printed documentation that comes with your server or software. Also, be sure to read the information in any README files that come with your software.

Most servers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages. The documentation that comes with your server also contains information about the diagnostic tests you can perform.

If you suspect a hardware problem, run the diagnostic tests and make a note of any error messages you receive. Then look up the message in the documentation and take the appropriate action.

If you suspect a software problem, consult the documentation (including README files) for the operating system or application program.

Using the HelpWare Support Family

IBM HelpWare is the “full-service” solution for IBM PC service and support wherever IBM products are sold and serviced. Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, HelpWare provides a wide variety of extended services that address almost any need.

Getting Help

Getting Help by Telephone

During the warranty period, you can get help and information by telephone through the IBM HelpWare PC Support Line. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your server and IBM monitor
- Installing and setting up IBM options purchased from IBM or an IBM reseller
- 60-day, preinstalled-operating-system support
- Arranging for service (on-site or carry-in)
- Arranging for overnight shipment of customer-replaceable parts

In addition, your purchase of an IBM PC Server makes you eligible for PC Server Startup Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface cards
- Installing and configuring network adapters

Your HelpWare representative can also fax or mail additional technical or product information to you, such as:

- Sales information
- Product brochures
- Locations of IBM resellers
- Services available through IBM

Please have the following information ready when you call:

- Serial numbers of your server, expansion enclosure, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

If possible, be at your server when you call.

Getting Help

These services are available 24 hours a day, 7 days a week (excluding some holidays).

- In the U.S. and Puerto Rico, call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Getting Help Around the World

If you need to move your server or expansion enclosure to another country, you can register for International Warranty Service. When you register with the International Warranty Service Office, you will receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM PC products.

For more information or to register for International Warranty Service in the U.S. or Canada, call 1-800-497-7426.

Getting Information by Fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada you can receive by fax free marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs). You can call the IBM PC Company Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine.

To access the IBM PC Company Automated Fax System, do the following:

- In the U.S., call 1-800-426-3395.
- In Canada, call 1-800-465-3299.

Using Electronic Support Services

If you have a modem, you can access public electronic bulletin boards and public messaging areas, electronic conferences, and searchable databases available in several of the most popular online information services.

Getting Help

Bulletin boards and online services contain information on many topics, such as:

- PC user groups
- PC questions and answers
- OS/2 topics
- Solving problems
- Technical information
- Hardware and software configurations
- Networking

The IBM PC Company Bulletin Board System (BBS) can be reached 24 hours a day, 7 days a week. Modem speeds of up to 14 400 baud are supported. Long distance telephone charges might apply. To access the PC Company BBS:

- In the U.S., call 1-919-517-0001.
- In Canada:
 - In Markham, call 905-316-4255.
 - In Montreal, call 514-938-3022.
 - In Toronto, call 416-492-1823.
 - In Vancouver, call 604-664-6466.

Commercial online services that contain information about IBM products include:

- CompuServe
Use the following GO words: IBMPS1, IBMPS2, ThinkPad, PowerPC, ValuePoint, IBMSVR, or IBMObI.
- PRODIGY
Use the Jump command; type **IBM** and select **PC Product Support**.
- America Online
Use the "Go to" keyword **IBM**.

Using the World Wide Web

Also available to you is the latest information about product compatibility and configuration. This information is updated as new PC Server products are announced. For a product to be included in the PC Server compatibility list, it must pass a strict set of hardware and operating system compatibility tests.

The following is a sample of the information available at <http://www.pc.ibm.com/servers/> on the World Wide Web.

- A listing of products that have been tested for compatibility with your IBM PC Server
- Certification and compatibility information about Network Operating Systems (NOS) and Operating Systems (OS)
- Direct access to device drivers, flash BIOS updates, and other code
- Descriptions of PC Server compatibility and certification tests
- Detailed reports about the performance of PC Servers

Purchasing Additional HelpWare Services

During and after the warranty period, you can purchase additional HelpWare services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and name might vary by country.

Network and Server Support Line

Network and Server Support is available for simple or complex networks made up of IBM servers and workstations using major network operating systems. In addition, many popular non-IBM adapters and network interface cards are supported.

Getting Help

This service includes technical support for:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

You can purchase this service for a single incident or for multiple incidents. For more information about purchasing Network and Server Support, see "Ordering Support Line Services."

Ordering Support Line Services

Enhanced PC Support Line, Network and Server Support Line, and Personal Computer Software Assistance Support Line services are available for products on the Supported Products list. To receive a Supported Products list:

- In the U.S.:
 1. Call 1-800-772-2227.
 2. Select the automated fax system option.
 3. Select the service for which you would like a Supported Products list:
 - For Enhanced PC Support Line, select document 11682.
 - For Network and Server Support Line, select document 11683.
 - For Personal Computer Software Assistance Support Line, select document 11684.
- In Canada, contact IBM Direct at 1-800-465-7999, or:
 1. Call 1-800-465-3299.
 2. Select the HelpWare catalog.
- In all other countries, contact your IBM reseller or IBM marketing representative.

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Warranty and Repair Services

You can upgrade your standard hardware warranty service or extend the service beyond the warranty period.

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service
If your warranty provides carry-in repair service, you can upgrade to on-site repair service, either standard or premium. The standard upgrade provides a trained servicer within the next business day (9 a.m. to 5 p.m., local time, Monday through Friday). The premium upgrade provides 4-hour average response, 24 hours a day, 7 days a week.
- On-site service to premium on-site service
If your warranty provides for on-site service, you can upgrade to premium on-site service (4-hour average on-site response, 24 hours a day, 7 days a week).

You also can extend your warranty. HelpWare Warranty and Repair Services offers a variety of post-warranty maintenance options. Availability of the services varies by product.

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-7697.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Getting Help

Consulting

If you want to better understand and more effectively use IBM PC Servers and other Personal Computer products, in the U.S. you can purchase HelpWare Consult Line support. This service offers telephone access to experts for consultation on agreed-to topics. The experts provide recommendations and corrective actions, as appropriate.

For more information about HelpWare Consult Line, call 1-800-772-2227.

Custom Services

If you are setting up a network and need help installing the network or the application programs, in the U.S. you can purchase assistance from HelpWare Custom Services. The following services are available:

- LAN Startup Services

This service provides assistance with setting up and customizing your network, including:

- Unpacking equipment
- Setting up and testing the hardware
- Connecting systems to LAN cabling
- Customizing the network operating system
- Customizing the network printer server

- Connectivity Services

This service provides hardware installation and connection to support a server and five or more workstations, using token-ring or 10BaseT Ethernet cabling.

For more information about LAN Startup and Connectivity Services, call 1-800-772-2227.

Obtaining IBM Operating System Updates

IBM provides update diskettes, called ServicePaks or corrective service diskettes (CSDs), to customers who report a DOS or OS/2 problem for which there is or will be a corrective program.

You can obtain update diskettes from the following sources:

- IBM PC Company BBS. See “Using Electronic Support Services” on page 103 for information on how to access this bulletin board system.
- IBM Software Solutions Center. In the U.S. or Canada, call 1-800-992-4777.
- IBM reseller or IBM marketing representative.

Ordering System Diskettes

If you have damaged Reference or Diagnostic Diskettes, you can order replacements from IBM.

To order replacements:

- In the U.S., call 1-800-845-4263.
- In Canada, call 1-800-565-3344.
- In other countries, contact your IBM reseller or IBM marketing representative.

Ordering Publications

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S. and Puerto Rico, call IBM PC Books at 1-800-426-7282.
- In Canada, call 1-800-465-1234.
- In other countries, contact your IBM reseller or IBM marketing representative.

Getting Help

Appendix A. Expansion Tower Records

Whenever you add options to your expansion enclosure, be sure to update the information in this appendix. Accurate, up-to-date records make it easier to add other options and, if the need should arise, to report a hardware problem.

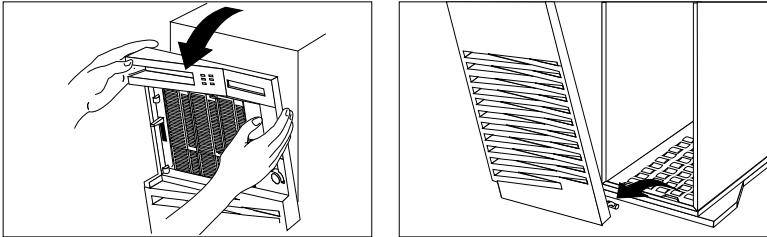
Recording Serial Numbers

Record and retain the following information. In the box below, check or highlight the applicable expansion enclosure information for future reference.

Product Name	IBM PC Server Enterprise Expansion Enclosure
Model	_____

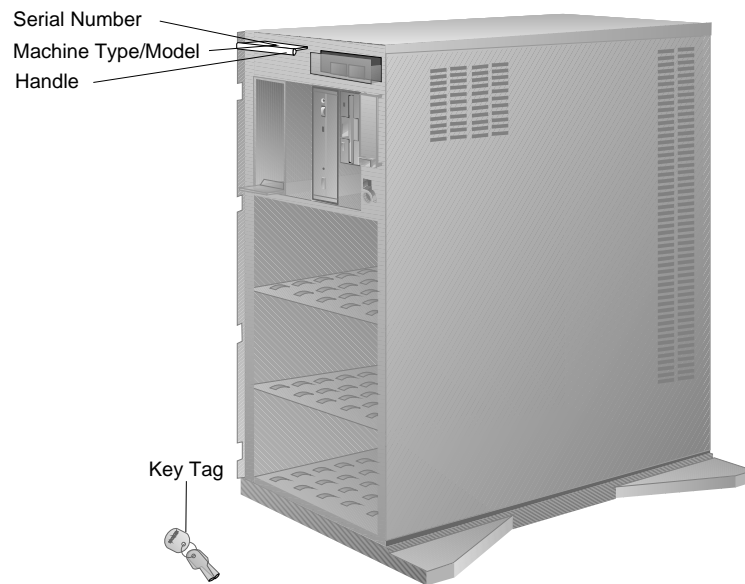
Serial Number	_____
Key Serial Number	_____

To see the expansion enclosure's identification numbers, you must first remove the front cover.



Recording Serial Numbers

The following illustration shows the locations of the expansion enclosure identification numbers.



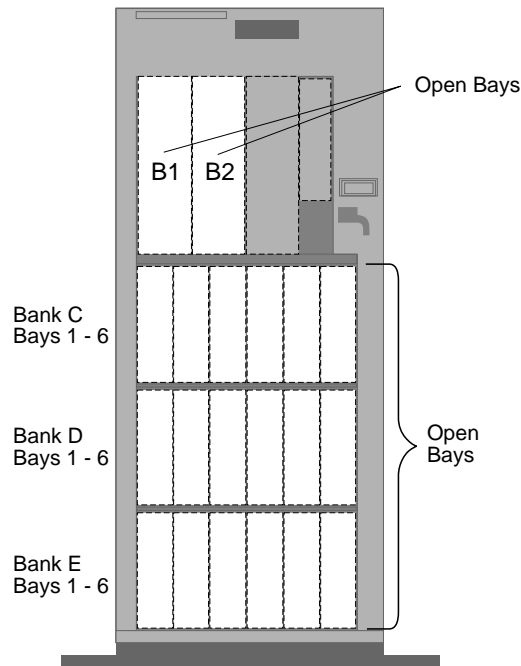
The serial number is also located on the top of the handle on the front of the expansion enclosure.

Anyone who has access to the key serial number and manufacturer address can order duplicate keys, so store the tag in a safe place.

Installed Device Records

Use Table 2 on page 114 to keep a record of your system's default configuration settings and the options currently installed in or attached to your expansion enclosure. This information can be helpful when you install additional options in your expansion enclosure or if you ever need to have your expansion enclosure serviced. Copy this table before recording information in it, in case you need extra space to write in new values later.

Refer to the following illustration of your expansion enclosure bays when completing Table 2 on page 114.



Note: If you attach a drive or other device to an adapter, record the server's expansion-slot number for that adapter in Table 2 on page 114.

Installed Device Records

Location	Drive Description
Bay B1	_____
Bay B2	_____
Bank C Bay 1	_____
Bank C Bay 2	_____
Bank C Bay 3	_____
Bank C Bay 4	_____
Bank C Bay 5	_____
Bank C Bay 6	_____
Bank D Bay 1	_____
Bank D Bay 2	_____
Bank D Bay 3	_____
Bank D Bay 4	_____
Bank D Bay 5	_____
Bank D Bay 6	_____
Bank E Bay 1	_____
Bank E Bay 2	_____
Bank E Bay 3	_____
Bank E Bay 4	_____
Bank E Bay 5	_____
Bank E Bay 6	_____

Table 2. Internal Drives and Devices

Appendix B. Product Warranties and Notices

The following is the statement of limited warranty for the United States, Canada, and Puerto Rico.

International Business Machines Corporation

Armonk, New York, 10504

Statement of Limited Warranty

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. If you have any questions, contact IBM or your reseller.

Machine: ??? Machine To Be Identified ???

Warranty Period*: ??? Duration To Be Identified ???

**Contact your place of purchase for warranty service information.*

Production Status

Each Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

For IBM or your reseller to provide warranty service for a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many of these transactions involve the removal of parts and their return to IBM. You represent that all removed parts are genuine and unaltered. A part that replaces a removed part will assume the warranty service status of the replaced part.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good

Notices

working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

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