IBM

IBM 9306 PC Server Rack Enclosure

User's Guide for 19-Inch Racks

First Edition (June 1996)

Contents

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.

To Connect	To Disconnect
Turn everything OFF.	Turn everything OFF.
First, attach all cables to devices.[1]	First, remove power cord from outlet.[2]
Attach signal cables to receptacles.	Remove signal cables from receptacles.
Attach power cord to outlet.	Remove all cables from devices.
Turn device ON.	
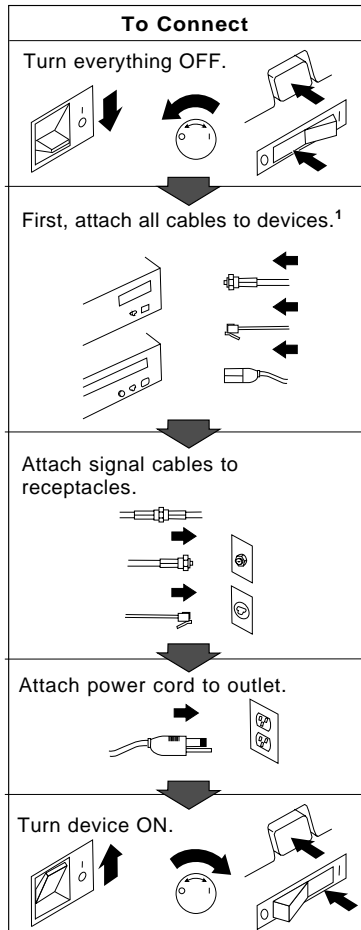
[1] In the U.K., by law, the telephone cable must be connected after the power cord.
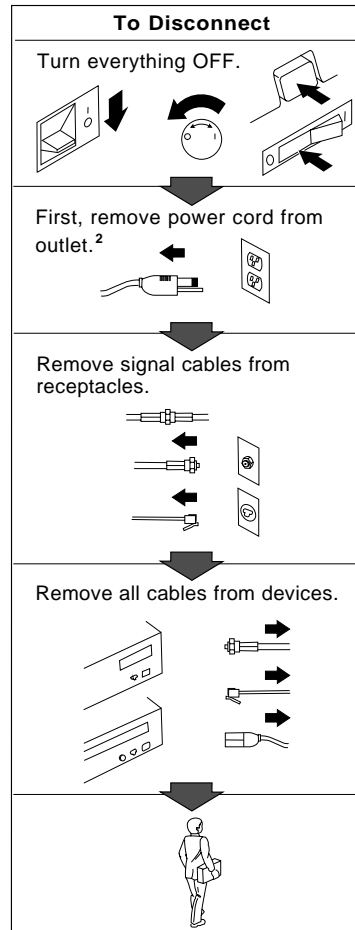
[2] In the U.K., by law, the power cord must be disconnected after the telephone line cable.

⚠ DANGER:

Le courant électrique provenant des câbles d'alimentation, télephoniques 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.*

Pour connecter	Pour deconnecter
Mettez tout hors tension.	Mettez tout hors tension.
Connectez d'abord tous les câbles sur les unités.	Débranchez d'abord le cordon d'alimentation de la prise murale.
Connectez les câbles de signaux sur les prises murales.	Déconnectez les câbles de signaux des prises murales.
Branchez le cordon d'alimentation sur la prise murale.	Déconnectez tous les câbles de unités.
Mettez l'unité sous tension.	

*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 information on unpacking and installing the IBM 9306 PC Server Rack Enclosure and PC Server Expansion Rack. Also, this book provides information for installing options and devices and operating the PC Server Rack.

Important

Be sure to keep this book with your PC Server Rack at all times.

Attention

All caution statements in this book end with a superscript number. This number is used to cross reference the English caution statement with the translated version of the caution statement that can be found in the *IBM 9306 PC Server Rack Enclosure Multilanguage Safety Statements* book. For example:

CAUTION:
The PC Server Rack is heavy and awkward to move.[1]

In this example, the translated version of the caution statement appears as statement number one in each of the language-specific sections of the *IBM 9306 PC Server Rack Enclosure Multilanguage Safety Statements* book.

IBM 9306 PC Server Rack enclosures provide a solution for installing and controlling multiple IBM PC Server systems. The PC server rack enclosures come in six models:

- 19-inch PC Server Quad Rack (9QS)
- 19-inch PC Server Tri Rack (9TS)
- 19-inch PC Server Quad Expansion Rack (9QX)
- 19-inch PC Server Tri Expansion Rack (9TX)
- 24-inch PC Server Quad Rack (4QS)
- 24-inch PC Server Quad Expansion Rack (4QX)

This document covers only the 19-inch models.

The 9QS and 9QX models are quad racks, housing up to four servers. The 9TS and 9TX models are tri racks, housing up to three servers. Table 1 shows the combination of servers that can be housed in each 19-inch rack.

Table 1. 19-inch server rack installation combinations			
Server Type	**Quad Rack (maximum 4 servers, any combination)**	**Tri Rack (maximum 3 servers, any combination)**	**Tri Rack (maximum 3 servers, any combination)**
Server 85	4	3	2
Server 95	4	3	2
Server 300	4	3	2
Server 500 or Server 700	0	0	1

PC Server racks 9QS and 9TS are primary racks. A primary rack provides a built-in server selector so you can connect one set of console devices (keyboard, mouse, and monitor). The server selector works independently from the server's operating systems, enabling the connected servers to run different operating systems.

PC Server expansion racks 9QX and 9TX allow you to install and control three (9TX) or four (9QX) more servers, using the primary PC server rack keyboard, mouse, monitor, and server selector. Figure 1 shows an example of a two rack suite.
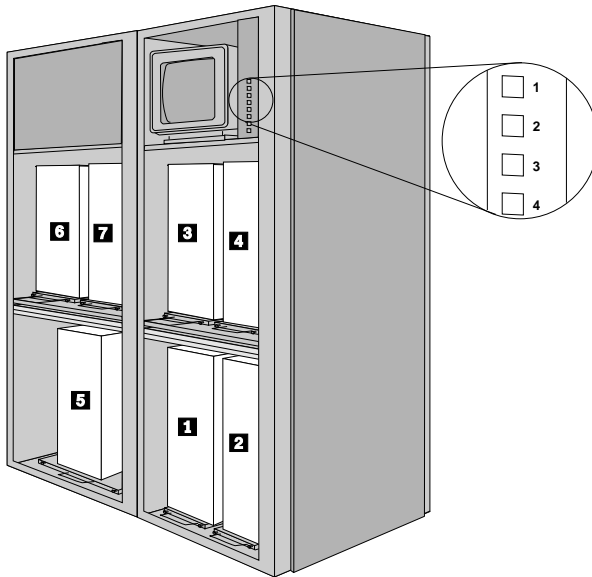
Figure 1. A tri expansion rack connected to a quad primary rack

The PC Server Rack is shipped preassembled and precabled, making installation and setup fast and efficient.

Package Contents

Your PC Server Rack package contains the following items:

- PC Server Rack cabinet (precabled)
- Power cable
- Compartment doors
- Monitor stand (compatible with IBM G41 and G50 monitors)
- Mouse Pad
- Stabilizer bar
- Stabilizer bar mounting bolts
- Keys for front and rear cabinet doors (keys are attached to front left side of the cabinet frame).
- *IBM 9306 PC Server Rack Enclosure User's Guide for 19-Inch Racks*

Available Options

The following options are available for use with your PC Server Rack:

- PS/2 Server 85/95 Mounting Plate

  A mounting plate used to securely mount PS/2 Server 85 and PS/2 Server 95 servers in the PC Server Rack.

- Series 300 Mounting Plate (not for use with PC Server 310)

  A mounting plate used to securely mount PC Server 300 models in the PC Server Rack.

- Series 500/700 Mounting Plate (not for use with PC Server 704)

  A mounting plate used to securely mount PC Server 500/700 models in the PC Server Rack.

- Enhanced Video Cable

  A video cable for use when SVGA resolutions are required.

- 19-inch/24-inch Rack Attachment Kit

  A bracket and bolt kit used to attach 19-inch and 24-inch racks together.

- 19-inch Rack Side Panel

  A side panel used when attaching a 19-inch expansion rack to a 24-inch rack.

- 24-inch Rack Side Panel

  A side panel used when attaching a 24-inch expansion rack to a 19-inch rack.

Unpacking and Installing the PC Server Rack

This section includes information on how to unpack and install your PC Server Rack. Follow these instructions carefully to ensure that your PC Server Rack is installed safely and properly.

Note: The information on unpacking and selecting a location for your PC Server Rack is duplicated in the PC Server Rack setup booklet that is found on the outside of the PC Server Rack shipping crate. If you have already unpacked, positioned, and stabilized your PC Server Rack, see "System Component Installation" on page 12 for further instructions.

Preparing for Installation

You will need three people to unpack and install the PC Server Rack. You will also need the following items:

- 8-inch adjustable wrench
- 5/32-inch allen wrench
- 3/16-inch allen wrench
- Utility knife
- Wire cutters
- Bubble level

Selecting a Location

To avoid damage to the PC Server Rack, be sure to move the PC Server Rack to the location where it will be installed before unpacking, assembling, or installing options. When selecting a location for the PC Server Rack, consider the following:

- The dimensions (width x depth x height) of the PC Server Rack are:

  Before Unpacking   36 in. x 46 in. x 84 in. (91.4 cm x 116.8 cm x 213.4 cm)

  After Unpacking   25.5 in. x 38.5 in. x 76.6 in. (64.8 cm x 97.8 cm x 194.6 cm)

- The maximum weight of the PC Server Rack is 604 lbs (247 Kg) empty and 1000 lbs (454 Kg) with four servers installed.

- The PC Server Rack is designed to accept power from a wall- or floor-mounted power outlet. The PC Server Rack requires a single-phase 200–240 V ac, 50/60 Hz, 16 A minimum house current protected by a 16 A breaker (20 A in the United States).
- You need at least 24 inches (61 cm) of space behind the cabinet and 30 inches (76 cm) of space in front of the cabinet (see Figure 2). This space is necessary for opening the front and rear doors, and will provide the access space needed during installation.
- If you plan to install a PC Server Expansion Rack, you will need at least 36 inches (91.4 cm) of space on the left side of the primary PC Server Rack. For more information about installing a PC Server Expansion Rack, see "Installing a PC Server Expansion Rack" on page 20.

Notes:

1. When moving the packing crate to the installation location, keep the cabinet vertical to prevent damaging the contents.

2. To ensure proper positioning, mark the location where you will be installing the PC Server Rack (with chalk or tape) before unpacking the PC Server Rack.

24"

Rear

Chalk line

30"

Front

Top View
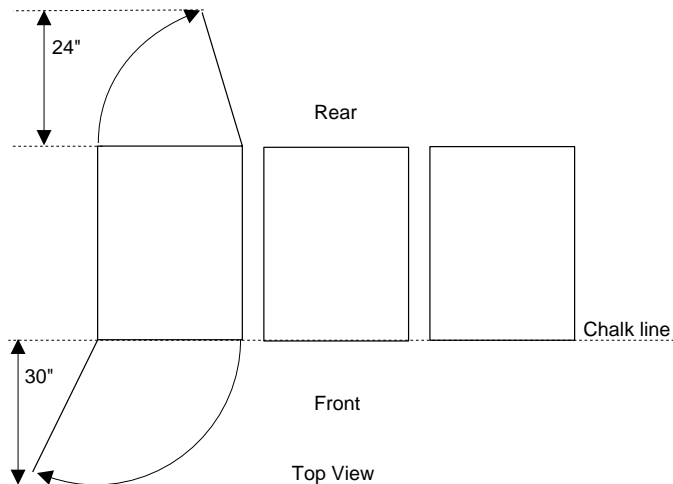
Figure 2. PC Server Rack position

CAUTION:
The PC Server Rack is heavy and awkward to move.[1]

Removing the Packaging Materials

Once the PC Server Rack has been moved to the installation location, you can remove the packaging materials.

CAUTION:
Be careful! These bands are under heavy tension and might spring loose when cut.[2]

1. Use the wire cutters to cut the metal bands.

2. Use the utility knife to remove the outer cardboard box. Cut at the corners of the box, because the foam packaging at the corners will help to protect the PC Server Rack from scratches.

3. Remove the internal cardboard and foam ends.

Removing the PC Server Rack from the Shipping Pallet

Once the packaging materials have been removed, you can remove the PC Server Rack from the shipping pallet.

CAUTION:
Three people are needed to safely perform this step.[3]

CAUTION:
Be careful! These bands are under heavy tension and might spring loose when cut.[2]

1. Use wire cutters to cut the two internal metal bands that secure the rack to the pallet.

2. Use the 8-inch adjustable wrench to remove the two lag bolts from the wood frame at the rear of the server rack cabinet. This releases the pallet supports (Figure 3).
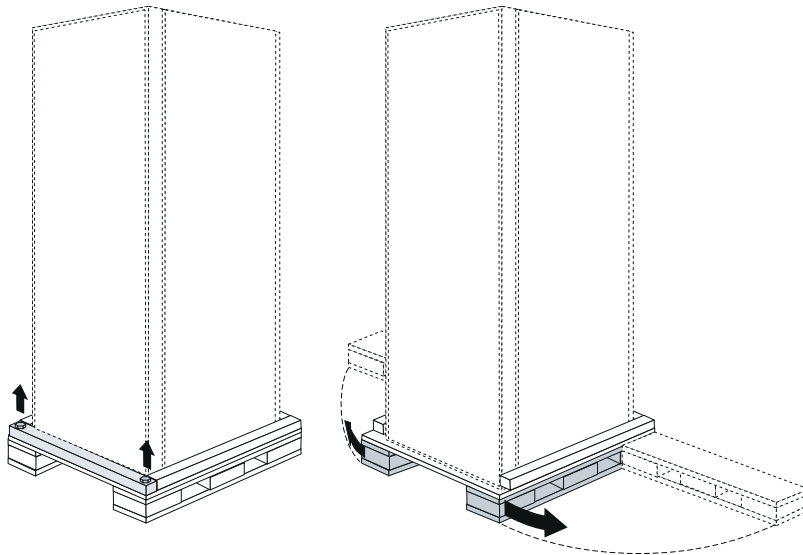
Figure 3. Removing the lag bolts

CAUTION:
Keep fingers and toes clear of the front of the pallet when pulling the pallet supports out.[4]

3. With one person holding the PC Server Rack at the rear (the side where you removed the two bolts) to prevent it from tipping forward suddenly, have the other two people simultaneously pull the pallet supports out, swinging them 90 degrees away from the pallet and transforming the pallet into a declining ramp (Figure 4).
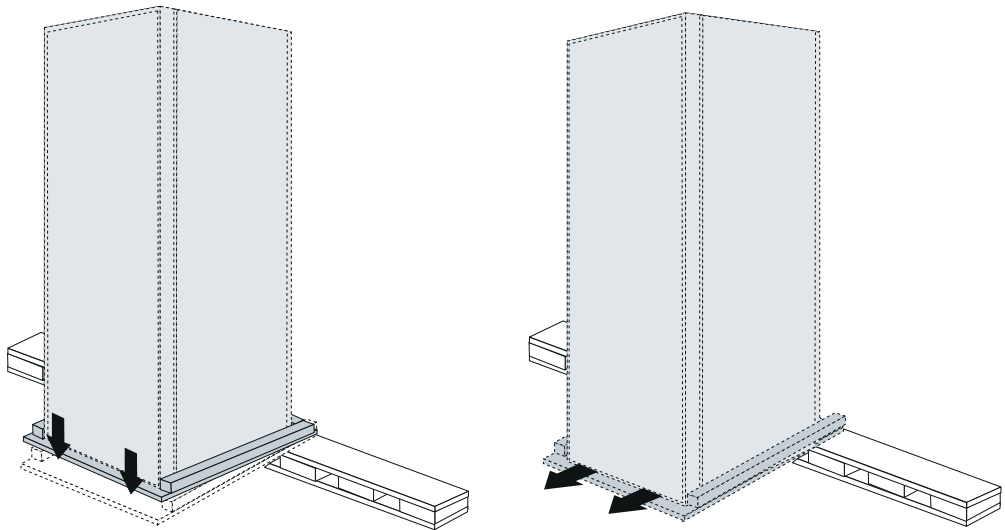
Figure 4. Transforming the pallet into a declining ramp

4. Roll the PC Server Rack down the ramp and off the pallet.

Positioning and Leveling the PC Server Rack

Once you have removed the PC Server Rack from the shipping pallet, position it in the location you selected for installation (see "Selecting a Location" on page 5). Remember to allow enough space for opening and closing doors and for access to the systems. The rear of the cabinet must have at least 24 inches (61 cm) of space to allow clearance and work space. The front of the cabinet must have at least 30 inches (76 cm) of space to allow the doors to open and close and to allow the sliding trays to be extended fully.

Once the PC Server Rack is in the desired position, you can level the cabinet.

1. Remove the compartment doors from inside the PC Server Rack and put them aside. You will install them later.

2. Using the 8-inch adjustable wrench, extend each of the four leveling feet. The leveling feet are located at the corners on the underside of the PC Server Rack. Lower the feet until they each make firm contact with the floor.

3. Once all four leveling feet have been extended and are touching the floor, use the 8-inch adjustable wrench to continue lowering the feet until the casters on the bottom of the PC Server Rack are about 1/8-inch above the floor.

4. Using the bubble level, continue making small adjustments to the leveling feet until the PC Server Rack is level and plumb.

5. Using the 8-inch adjustable wrench, tighten the leveling feet lock-nuts securely.

6. Refer to Figure 5 and bolt the stabilizer bar to the front of the PC Server Rack using the 8-inch adjustable wrench. Make sure the bar firmly touches the floor and tighten the bolts securely.
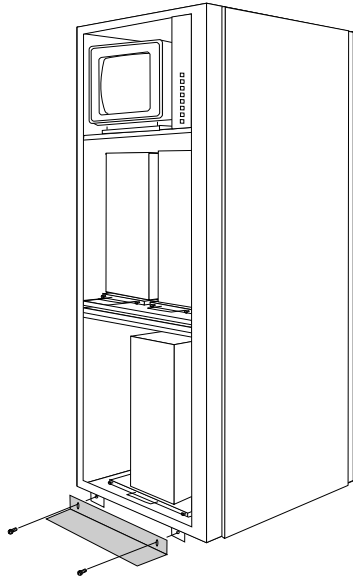
Figure 5. Installing the stabilizer bar

Your PC Server Rack is now in position and secure. You are now ready to install additional system components and options.

Now that the PC Server Rack has been properly installed and stabilized, you can install the remaining system components that will complete your PC Server Rack.

You will need the following components (not included with your PC Server Rack) to complete your installation:

- IBM G50 Monitor or compatible multifrequency monitor.

  Notes:

  1. The monitor must be a 200–240 V ac monitor with an IEC 320 C14 power plug on the back of the monitor *or* a C13 plug at the end of the monitor power cord.

  2. The PC Server Rack monitor housing (with the server selector in place) is 16.75 inches (42.5 cm) deep, with an opening 14.25 inches (36.2 cm) high by 14.75 inches (37.5 cm) wide. Check your monitor's dimensions to be sure it will fit into this opening with the server-selector keypad in place.

- One of the following 84-key keyboards.

  - Space Saver Keyboard
  - Space Saver Keyboard with TrackPoint II
  - Quiet Touch Keyboard with TrackPoint II.

- Pointing device — you can use the PS/2 mouse included with one of the servers you will install in the PC Server Rack, or the TrackPoint II.

Installing the Cabinet Doors

To install the cabinet doors:

1. Remove any packing material from the doors.

2. Inspect the doors for damage.

3. Hang the doors on the appropriate hinges (see Figure 6).
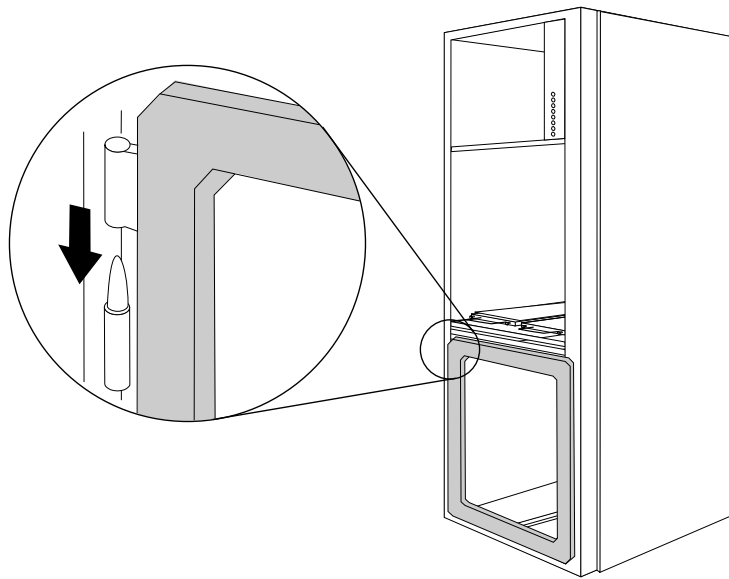
Figure 6. Installing the cabinet doors

Installing a Monitor

The PC Server Rack is designed to accommodate a variety of monitors. However, because there are so many variables in monitor selection, a monitor is not included with your PC Server Rack.

Note: The monitor must be a 200–240 V ac monitor with an IEC 320 C14 power plug on the back of the monitor *or* a C13 plug at the end of the monitor power cord.

CAUTION:
Make sure that the power to the PC Server Rack is disconnected before installing a monitor.[5]

When you have selected a monitor for use with your PC Server Rack, follow these installation instructions:

1. Check your monitor dimensions. (Refer to page 12)

   Note: If your monitor has a swivel base, you will probably need to remove the base.

2. Attach the monitor stand (IBM G41 and G50 monitors only).

   If you are using an IBM G41 or G50 monitor, you will need to attach the monitor stand (included with the PC Server Rack). To remove the monitor swivel base:

   a. Turn the monitor upside down.

   b. Remove the retaining screw at the rear of the swivel base.

   c. Slide the base toward the rear of the monitor, and then lift to remove it from the monitor-casing mounting slots.

After you remove the swivel base, you can attach the monitor stand to the monitor. To attach the monitor stand:

d. Remove the "loop" side of the hook-and-loop fastener strip from the monitor stand.

The "hook" side of the hook-and-loop fastener strip is already attached to the monitor stand. Pull the "loop" side of the hook-and-loop fastener strip off the "hook" side of the strip.

e. Attach the "loop" side of the hook-and-loop fastener strip to the bottom of the monitor.

When you removed the monitor swivel base you exposed five mounting slots (three at the front and two at the rear of the monitor base). You must place the "loop" side of the hook-and-loop fastener strip between the left and right mounting slots at the front of the monitor's casing, covering the center mounting slot. The three forward mounting slots are set in a shallow indentation at the front of the bottom of the monitor (see Figure 7).
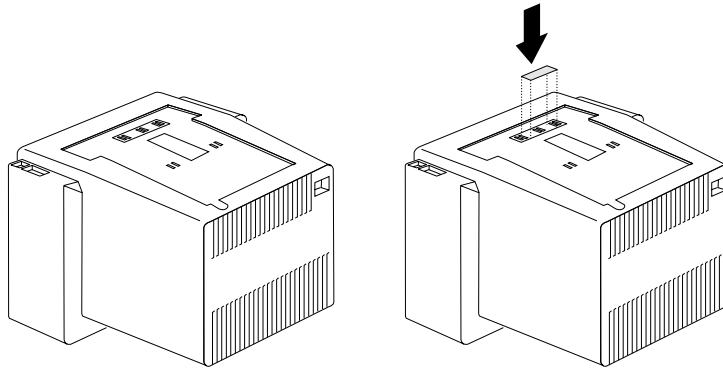
Figure 7. Monitor bottom and hook-and-loop fastener strip placement

Pull the protective backing off the "loop" side of the hook-and-loop fastener strip so that the adhesive is exposed and place the strip between the left and right mounting slots. Press firmly on the strip for approximately five minutes to ensure that it is securely attached to the monitor.

f. Insert the two tabs at the rear of the monitor stand (opposite of the hook-and-loop fastener strip) into the two rear mounting slots in the bottom of the monitor. Then pivot the monitor stand forward to press the "hook" and the "loop" strips of the hook-and-loop fastener together (see Figure 8).
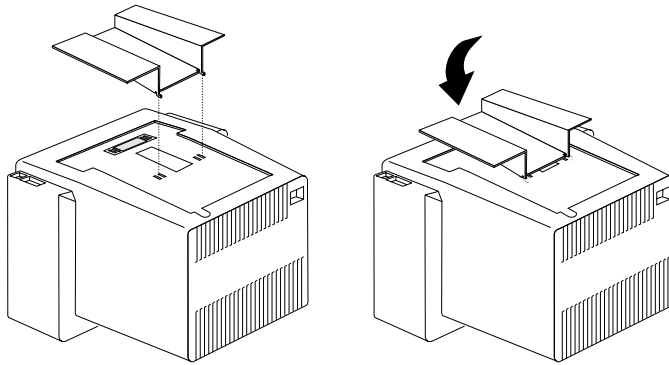
Figure 8. Attaching the monitor stand to the monitor

3. Place the monitor into the monitor housing.

   You will need two people to place the monitor into the monitor housing. While one person supports the monitor, have the second person feed the monitor video cable through the cutout in the rear right corner of the monitor housing. Plug the precabled monitor power cord into the back of the monitor. Then, lift the monitor into the housing, pushing any extra monitor cable out through the cutout (see Figure 9).
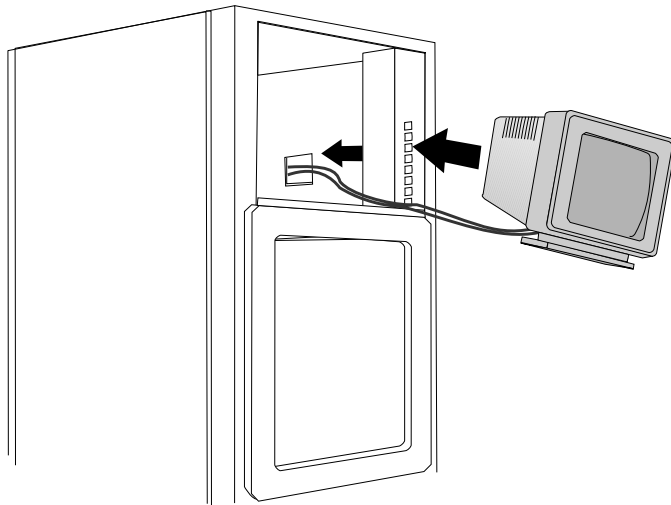
Figure 9. Installing the monitor

4. Connect the monitor video cable.

   Plug the video cable into the connector labeled MON in the back of the server selector. For information on the server selector, see "The Server Selector" on page 48.

Attaching the Mouse Pad

The mouse pad attaches to either side of the keyboard tray.

1. Pull out the PC Server Rack keyboard tray.

2. With the mouse pad in a vertical position, insert the hooked lip of the mouse pad into the slot on the edge of the keyboard tray. Then, lower the mouse pad into a horizontal position to lock it into place (see Figure 10). When not in use, the mouse pad can be stored behind the keyboard on the keyboard tray.
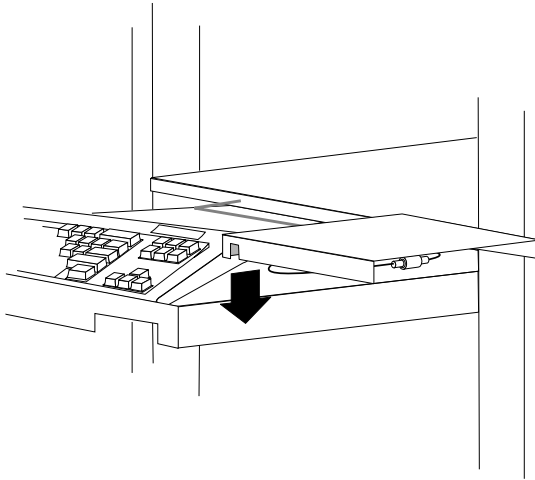
Figure 10. Attaching the mouse pad

Installing the Keyboard and Mouse

The server selector allows you to use one keyboard and mouse to control up to eight connected servers.

To install the keyboard and mouse:

1. Remove any packing material from the keyboard and mouse, if necessary.

2. Place the keyboard and mouse on the keyboard tray.

3. Connect the keyboard and mouse cables to the extension cables provided (see Figure 11). The keyboard extension has a **K** label, and the mouse extension cable has an **M** label.
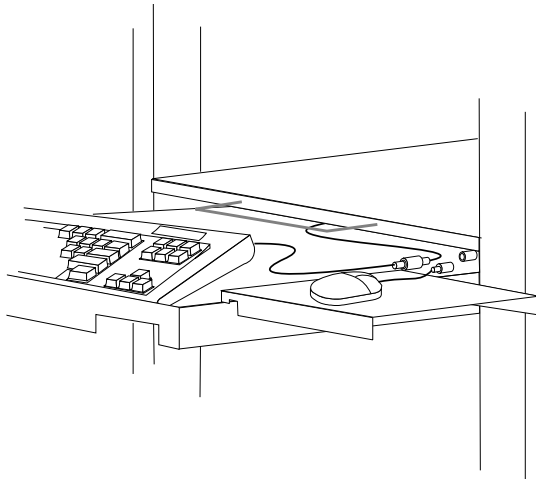
Figure 11. Installing the keyboard and mouse

4. Push the keyboard tray toward the front of the cabinet.

Installing a PC Server Expansion Rack

The PC Server Expansion Rack is installed beside your primary PC Server Rack and allows you to use the PC Server Rack keyboard, mouse, monitor, and server-selector console to control up to four additional servers. Like the primary PC Server Rack, the PC Server Expansion Rack comes precabled to simplify installation and organization of your servers.

Notes:

1. The PC Server Expansion Rack must be installed on the left side of the primary PC Server Rack, as shown in Figure 12.

2. If you are installing a 19-inch PC Server Expansion Rack to a 24-inch PC Server Rack, you will need the 19-inch/24-Inch Rack Attachment Kit and a 19-inch side-panel with attachment hardware.
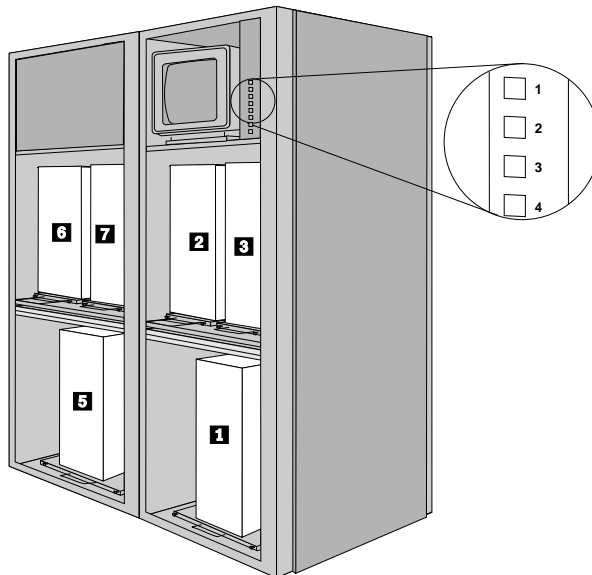
Figure 12. PC Server Expansion Rack position

To install the PC Server Expansion Rack:

1. Power off the primary PC Server Rack.

   CAUTION:
   Working with electricity can be dangerous. Please take proper precautions to avoid risk of injury.[6]

   a. Shut down and power off all installed servers.

   b. Open the rear door of the PC Server Rack cabinet.

   c. Power off the server-selector unit.

      The power switch for the server-selector unit is located in the upper right corner of the rear of the server-selector unit.

   d. Disconnect the PC Server Rack from the location's power supply.

      - If the PC Server Rack is plugged into a wall-mounted power supply, disconnect the power cord plug from the wall socket.
      - If the power cord is wired directly into the installation location's power supply, open the rear door of the PC Server Rack cabinet and disconnect the power plug from the base of the power distribution unit.

2. Remove the left side panel from your PC Server Rack. (see Figure 13).

   a. Use a 3/16-inch allen wrench to remove the two side-panel security screws from inside rear PC Server Expansion Rack frame member.

   b. Use a 3/16-inch allen wrench to remove the two screws that secure the bottom of the left side-panel of the PC Server Rack

   c. Lift the side panel and remove it from the PC Server Rack. Set the side panel safely aside.

   d. Use a 3/16-inch allen wrench to remove the side-panel hanger-brackets from the PC Server Rack.

   Save the screws, hanger-brackets, and the side panel. You will need them to complete your installation.
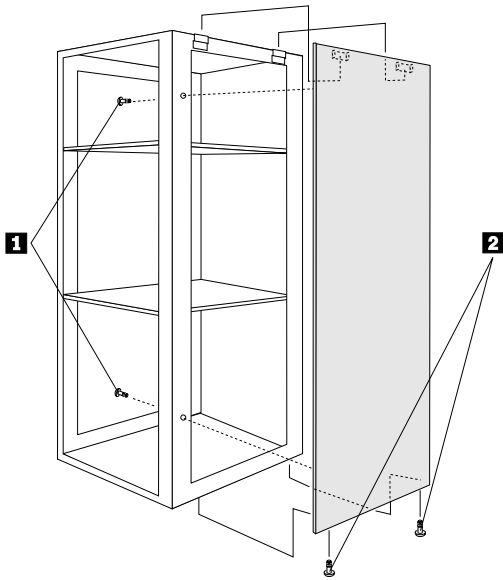
Figure 13. Removing the Server Rack side panel

3. Unpack your PC Server Expansion Rack.

   The packaging for the PC Server Expansion Rack is identical to the packaging for the PC Server Rack. For instruction on unpacking the PC Server Expansion Rack, see "Unpacking and Installing the PC Server Rack" on page 5.

4. Position the PC Server Expansion Rack to the left side of the PC Server Rack. Be sure to allow enough space for opening and closing doors and for access to the systems. The rear of the cabinet must have at least 24 inches (61 cm) of space to allow clearance and work space. The front of the cabinet must have at least 30 inches (76 cm) of space to allow the doors to open and close and to allow the sliding trays to be extended fully.

5. Level the PC Server Expansion Rack.

   Once the PC Server Expansion Rack is correctly positioned, you can level the cabinet.

   a. Remove the compartment doors from inside the PC Server Expansion Rack and put them aside. You will install them later.

   b. Using the 8-inch adjustable wrench, extend each of the four leveling feet. The leveling feet are located at the corners on the underside of the PC Server Expansion Rack. Lower the feet until they each make firm contact with the floor.

   c. Once all four leveling feet have been extended and are touching the floor, use the 8-inch adjustable wrench to continue lowering the feet until the eight bolt holes on the cabinet frames are aligned.

   d. Using the bubble level, continue making small adjustments to the leveling feet until the PC Server Expansion Rack is level and plumb.

   e. Using the 8-inch adjustable wrench, tighten the leveling feet lock-nuts securely.

f. Refer to Figure 14 and bolt the stabilizer bar to the front of the PC Server Expansion Rack using the 8-inch adjustable wrench. Make sure the bar firmly touches the floor and tighten the bolts securely.
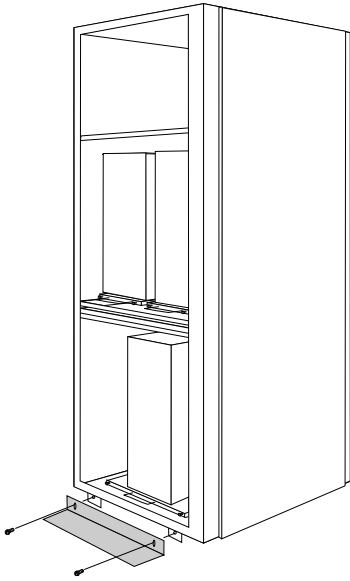
Figure 14. Installing the stabilizer bar

6. Bolt the PC Server Expansion Rack to the PC Server Rack.

   Using a 3/16-inch allen wrench and an 8-inch adjustable wrench, bolt the PC Server Expansion Rack to the primary PC Server Rack with four bolts, nuts, and lockwashers included with your PC Server Expansion Rack You will need to open the rear cabinet door on the PC Server Expansion Rack. The keys to this cabinet door are attached to the front left side of the PC Server Expansion Rack frame.

7. Connect the PC Server Expansion Rack cable bundle to the primary PC Server Rack server selector unit.

   a. Feed the PC Server Expansion Rack cable bundle into the PC Server Rack cabinet.

      Open the PC Server Rack rear cabinet door. Then, push the entire length of the PC Server Expansion Rack cable bundle through the opening between the two cabinets and into the PC Server Rack cabinet.

   b. Using the labels on each of the connectors at the end of the cable bundle as a guide, plug each of the video, keyboard, and mouse cables into the appropriate connectors on the back of the server-selector unit. For example, plug the video cable labeled "MON5" into the server-selector unit connector labeled "MON5." For information on the server-selector unit, see "The Server Selector" on page 48.

      Note: Mouse connectors are marked with a small red arrow.

8. Install the PC Server Expansion Rack cabinet doors.

   a. Remove any packing material from the doors.

   b. Inspect the doors for damage.

   c. Hang the doors on the appropriate hinges (see Figure 15).
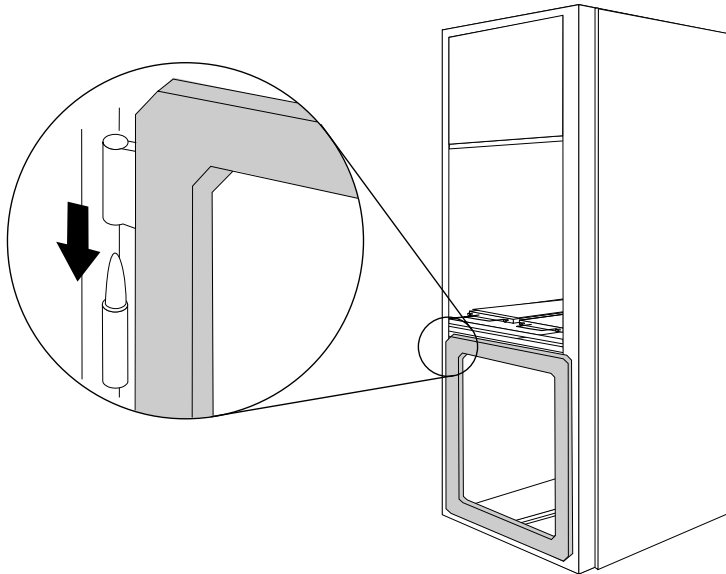
Figure 15. Installing the PC Server Expansion Rack cabinet doors

   Note: The upper cabinet door has a trim piece screwed to the
   bottom of the door.

9. Attach the two side-panel hanger-brackets using the rear pairs of holes as shown in Figure 16.
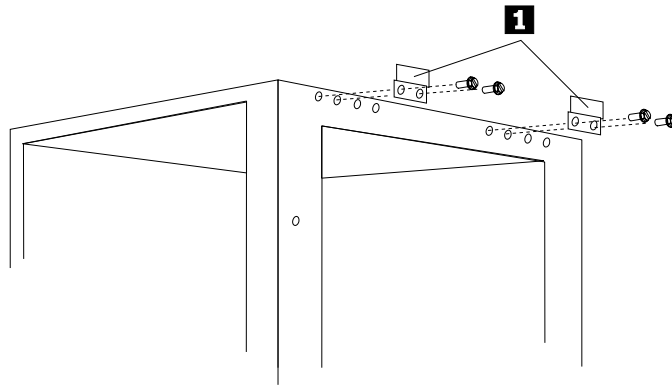
Figure 16. Installing the side-panel hanger-brackets

10. Install the left side-panel you removed from the PC Server Rack to the left side of the PC Server Expansion Rack. Refer to Figure 17.
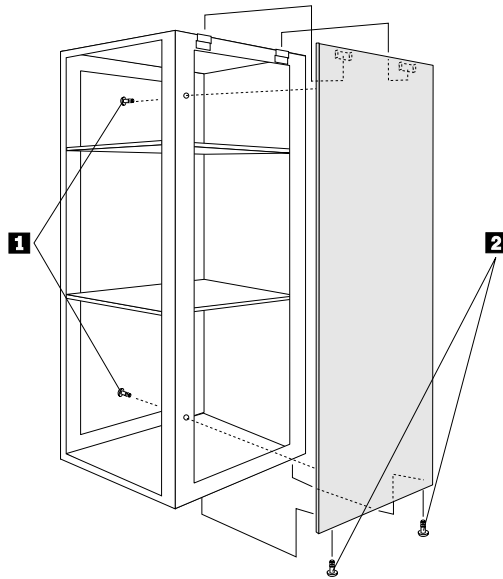
Figure 17. Installing the side-panel

Your PC Server Expansion Rack installation is now complete. For information on how to install servers in your PC Server Expansion Rack, see "Installing Servers" on page 29. After you have installed servers in your PC Server Expansion Rack, follow the directions in "Connecting the Power Supply" on page 46 to connect your PC Server Expansion Rack to a power supply.

Servers are installed on the PC Server Rack's sliding trays. There are three or four sliding trays, which correspond to a button number on the server-selector keypad. The PC Server Expansion Rack includes three or four additional sliding trays, enabling you to install and control up to four additional servers. See Figure 18 for a diagram of the sliding trays and their corresponding server-selector keypad button numbers.

CAUTION:
To ensure cabinet stability, install servers in the bottom sliding trays first.[7]

CAUTION:
The PC Server Rack is heavy and awkward to move. After servers have been installed, you will need to remove any servers and any installed peripheral devices to move the PC Server Rack cabinet.[8]
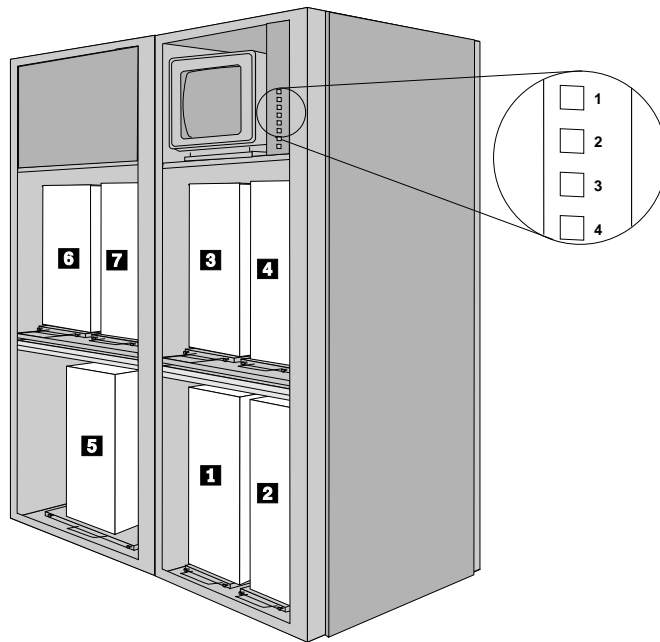
Figure 18. The PC Server Rack sliding tray and keypad button numbers

Each server is installed on the sliding tray using a fastening system designed to secure a specific model of server. The instructions for system-specific installations (PS/2 Server 85, PS/2 Server 95, PC Server 300 models, and PC Server 500/700 models) can be found in the following sections:

- If you are installing a PS/2 Server 85 or a PS/2 Server 95, see "Installing a PS/2 Server 85 or PS/2 Server 95" on page 31.

- If you are installing a PC Server 300 model, see "Installing an IBM PC Server in the 300 Series" on page 35.

- If you are installing a PC Server 500/700 model, see "Installing an IBM PC Server in the 500 Series or the 700 Series" on page 39.

Installing a PS/2 Server 85 or PS/2 Server 95

A mounting plate and bracket are used to securely mount a PS/2 Server 85 or a PS/2 Server 95 into your PC Server Rack. The PS/2 Server 85/95 Mounting Plate kit includes:

- Mounting plate
- Mounting bracket
- 4 mounting screws

Note: The PS/2 Server 95 model might need a BIOS update to function properly in the PC Server Rack. The required BIOS version for this server is Revision Level 08 (or higher).

To obtain a BIOS update:

- Download the current BIOS version for your server from the IBM PC Company Bulletin Board System by calling 1-919-517-0001.

- Obtain a BIOS update from the IBM Personal Systems HelpCenter. In the United States or Canada, call 1-800-772-2227. Outside the United States and Canada, contact your IBM reseller, IBM marketing representative, or your place of purchase.

BIOS updates are customer installable. Review the README file included with the BIOS update for installation information and instructions.

CAUTION:
To ensure cabinet stability, install servers in the bottom sliding trays first.[7]

CAUTION:
Before installing a server, make sure that the stabilizer bar is installed.[9]

To install a PS/2 Server 85 or PS/2 Server 95:

1. Select a sliding tray and corresponding server-selector keypad button.

   See Figure 18 on page 29 for a diagram of the sliding trays and their corresponding server-selector keypad button numbers.

2. Loosen the two thumb screws on the selected sliding tray, then fully extend the sliding tray.

3. Remove the support pedestal from the bottom of the server. For information on how to remove the pedestal, see the documentation that comes with your server.

4. Place the mounting plate on the sliding tray with the mounting plate's tabs pointing toward the back of the sliding tray (see Figure 19).
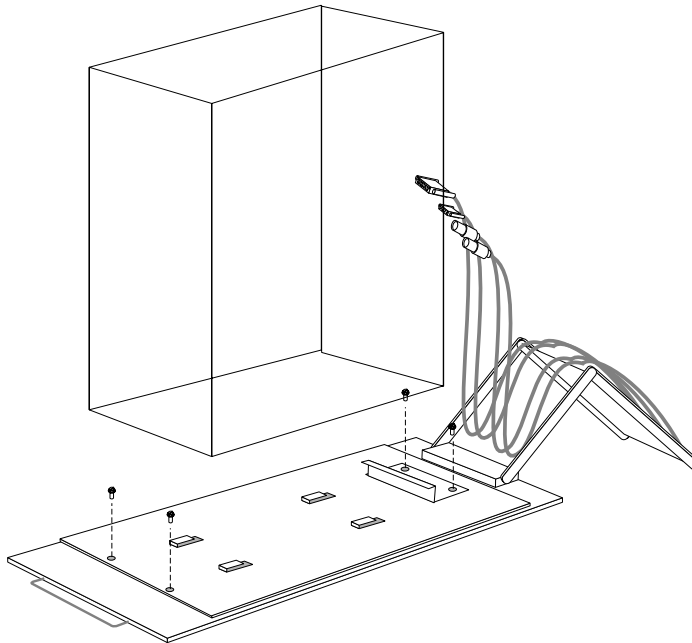
Figure 19. Installing a PS/2 Server 85/95

5. Align the two screw holes at the front of the mounting plate with the corresponding holes at the front of the sliding tray. Then, insert and tighten two mounting screws through these holes.

6. Set the switchable power supply (found on the rear of the server) to 200-240 V ac.

   ATTENTION:
   Make sure the power supply is set correctly. Failure to do so can damage your server.

CAUTION:
You will need at least two people to safely lift and place the server on the sliding tray.[10]

7. Place the server onto the sliding tray. Be sure that the tabs on the mounting plate are inserted into the corresponding holes on the bottom of your server. When all tabs are inserted properly, slide the server forward gently to lock the tabs into place.

8. Place the mounting bracket on the rear of the mounting plate so that the mounting bracket lip rests firmly against the back of the server. Align the two mounting-bracket screw holes with the corresponding holes on the mounting plate and sliding tray. Insert two mounting screws through these holes and tighten securely.

9. Press the locking tab on the sliding tray (located at the center of the right side of the sliding tray) and push the sliding tray into the PC Server Rack. Tighten the two thumb screws to secure the sliding tray in place.

10. Connect the power, video, keyboard, and mouse cables.

   Notes:

   a. The cables are bundled and numbered to correspond with the number of the sliding tray and server-selector keypad button.

   b. The power cable is black, with an IEC 320 E13 connector.

   c. The video cable has a sub D, 15-pin video connector.

   d. The keyboard cable has red arrows on the end, with a mini DIN 6-pin connector.

   e. The mouse cable has plain arrows on the end, with a mini DIN 6-pin connector.

Installing an IBM PC Server in the 300 Series

A mounting plate is used to securely mount a PC Server in the 300 series (except a PC Server 310) into your PC Server Rack. The Series 300 Mounting Plate kit includes:

- Mounting plate
- 4 mounting screws

Note: The Series 300 Mounting Plate kit cannot be used to install a PC Server 310.

CAUTION:
To ensure cabinet stability, install servers in the bottom sliding trays first.[7]

CAUTION:
Before installing a server, make sure that the stabilizer bar is installed.[9]

To install a PC Server 300 (except a PC Server 310):

1. Select a sliding tray and corresponding server-selector keypad button.

   See Figure 18 on page 29 for a diagram of the sliding trays and their corresponding server-selector keypad button numbers.

2. Loosen the two thumb screws on the selected sliding tray, then fully extend the sliding tray.

3. Remove the support pedestal from the bottom of the server and remove the server enclosure. For information on how to remove the pedestal and the server cover, see the documentation that comes with your server.

   Note: Save the screws; you will need them to attach the server to the mounting plate.

4. Attach the server to the mounting plate.

   a. Place the server onto the mounting plate so that the server rests between the two vertical rails along the sides of the mounting plate and so that the rear of the server rests firmly against the tab at the rear of the plate.

b. Locate the four screw holes in the bottom of your server. Be sure that they are lined up with the corresponding holes in the mounting plate.

c. Use the screws that you removed from the server pedestal to attach the server to the mounting plate. Insert the screws into the server case from underneath the mounting plate and tighten until snug (see Figure 20).
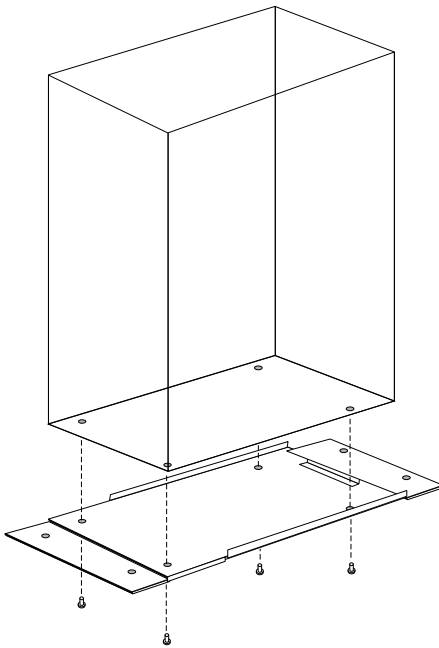
Figure 20. Attaching a PC Server 300 to the mounting plate

d. Replace the server cover.

5. Set the switchable power supply (found on the rear of the server) to 200-240 V ac.

ATTENTION:
Make sure the power supply is set correctly. Failure to do so can damage your server.

CAUTION:
You will need at least two people to safely lift and place the server on the sliding tray.[10]

6. Place the server onto the sliding tray.

7. Locate the four screw holes at the corners of the mounting plate. Be sure that they are lined up with the corresponding holes on the sliding tray (see Figure 21).
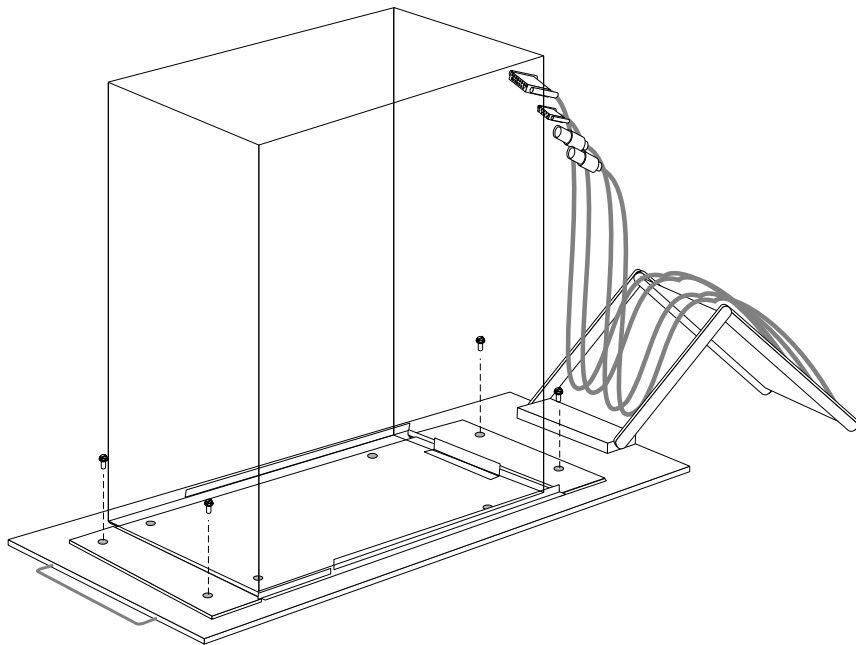
Figure 21. Installing a PC Server 300

8. Insert the four mounting screws (included with your mounting plate kit) through these holes and tighten securely.

9. Press the locking tab on the sliding tray (located at the center of the right side of the sliding tray) and push the sliding tray into the PC Server Rack. Tighten the two thumb screws to secure the sliding tray in place.

10. Connect the power, video, keyboard, and mouse cables.

    Notes:

    a. The cables are bundled and numbered to correspond with the number of the sliding tray and server-selector keypad button.

    b. The power cable is black, with an IEC 320 E13 connector.

    c. The video cable has a sub D, 15-pin video connector.

    d. The keyboard cable has red arrows on the end, with a mini DIN 6-pin connector.

    e. The mouse cable has plain arrows on the end, with a mini DIN 6-pin connector.

Installing an IBM PC Server in the 500 Series or the 700 Series

An IBM PC Server in the 500 series or the 700 series (except a PC Server 704) can be installed only in the single, bottom sliding tray in a tri primary rack or a tri expansion rack.

A mounting plate is used to securely mount a series 500 or series 700 into your PC Server Rack. The Series 500/700 Mounting Plate kit includes:

- Mounting plate with locking tab
- 4 mounting screws

Notes:

1. The Series 500/700 Mounting Plate kit cannot be used to install a PC Server 704.

2. PC Server 500 and PC Server 720 models might need a BIOS update to function properly in the PC Server Rack. The required BIOS versions for these servers are:

Server Model	BIOS Level
PC Server 500	Revision Level 08 (or higher)
PC Server 720	Revision Level 06 (or higher)

To obtain a BIOS update:

- Download the current BIOS version for your server from the IBM PC Company Bulletin Board System by calling 1-919-517-0001.

- Obtain a BIOS update from the IBM Personal Systems HelpCenter. In the United States or Canada, call 1-800-772-2227. Outside the United States and Canada, contact your IBM reseller, IBM marketing representative, or your place of purchase.

BIOS updates are customer installable. Review the README file included with the BIOS update for installation information and instructions.

CAUTION:
To ensure cabinet stability, install servers in the bottom sliding trays first.[7]

CAUTION:
Before installing a server, make sure that the stabilizer bar is installed.[9]

To install a PC Server 500 or 700:

1. Loosen the two thumb screws on the single, bottom sliding tray in a tri primary rack or a tri expansion rack; then fully extend the sliding tray.

   See Figure 18 on page 29 for a diagram of the sliding trays and their corresponding server-selector keypad button numbers.

2. Remove the support pedestal from the bottom of the server. For information on how to remove the pedestal, see the documentation that comes with your server.

3. Place the mounting plate on the sliding tray with the mounting plate's tabs pointing toward the front of the sliding tray (see Figure 22).
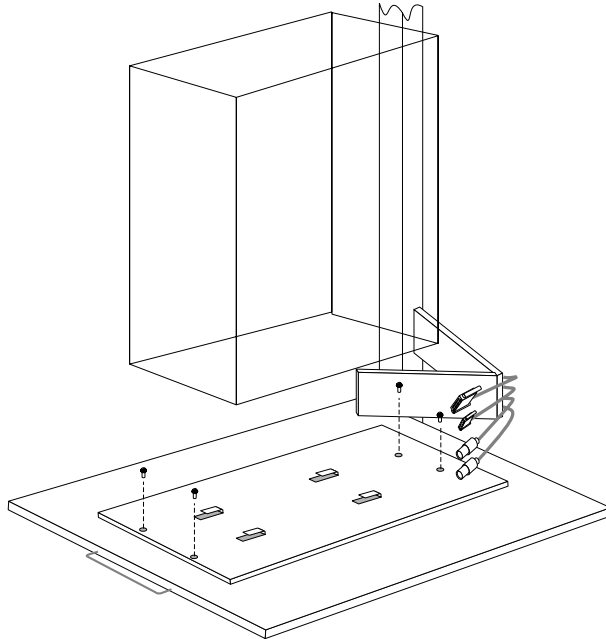
Figure 22. Installing a PC Server 500 or 700

4. Align the four screw holes (one at each corner of the mounting plate) with the corresponding holes at the corners of the sliding tray.

   Note: The Series 500/700 Mounting Plate has a locking tab that secures the server into place on the mounting plate. This tab is located at the front left side of the mounting plate.

   Insert the mounting screws through the screw holes and tighten securely.

CAUTION:
You will need at least two people to safely lift and place the server on the sliding tray.[10]

5. Place the server onto the sliding tray. Be sure that the tabs on the mounting plate are inserted into the corresponding holes on the bottom of your server. When all tabs are inserted properly, slide the server backward gently until the locking tab on the mounting plate clicks, locking the server securely into place.

6. Press the locking tab on the sliding tray (located at the center of the right side of the sliding tray) and push the sliding tray into the PC Server Rack. Tighten the two thumb screws to secure the sliding tray in place.

7. Connect the power, video, keyboard, and mouse cables.

   Notes:

   a. The cables are bundled and numbered to correspond with the number of the sliding tray and server-selector keypad button.

   b. The power cable is black, with an IEC 320 E13 connector.

   c. The video cable has a sub D, 15-pin video connector.

   d. The keyboard cable has red arrows on the end, with a mini DIN 6-pin connector.

   e. The mouse cable has plain arrows on the end, with a mini DIN 6-pin connector.

Installing External Cables

The PC Server Rack comes with power, video, keyboard, and mouse cables already installed and ready to be plugged into any installed servers. To install additional cables:

1. Open the rear cabinet door.

2. Plug the cable into the selected server.

3. Open the front cabinet doors, unscrew the two thumbscrews on the selected server's sliding tray, and fully extend the sliding tray.

4. From the rear of the cabinet, open the unused cable loops on the sliding tray's support arm by pinching the small locking tab and pulling up on the free end of the loop.

5. Use the cable loops to secure the new cable into place along the length of the support arm.

6. Press the locking tab on the sliding tray (located at the center of the right side of the sliding tray) and push the sliding tray into the PC Server Rack. Tighten the two thumb screws to secure the sliding tray in place.

Installing the Enhanced Video Cable

These instructions apply only to customers who have ordered the Enhanced Video Cable option and intend to use it with the a server installed in the PC Server Rack.

Use the Enhanced Video Cable when SVGA resolutions are required. Each Enhanced Video Cable kit includes one video cable. This cable can be used in place of the precabled video cable that comes with your PC Server Rack. (The standard video cable that comes with the PC Server Rack supports VGA resolutions).

You can use one or more of these cables in your PC Server Rack. You do *not* need to replace all of the PC Server Rack video cables if you will be using an Enhanced Video Cable with one or more of the installed servers. However, enhanced SVGA video performance will be available only from servers that have an Enhanced Video Cable installed.

Note: Without the Enhanced Video Cable, you might not achieve optimal SVGA video performance.

To Install the Enhanced Video Cable:

1. Open the rear cabinet door.

2. Unplug the video cable from the video port of the server to which you will be connecting the Enhanced Video Cable.

3. Plug the Enhanced Video Cable into the server video port.

4. Open the front cabinet doors, unscrew the two thumbscrews on the selected server's sliding tray, and fully extend the sliding tray.

5. Use the cable loops to secure the Enhanced Video Cable into place along the length of the support arm.

6. Press the locking tab on the sliding tray (located at the center of the right side of the sliding tray) and push the sliding tray into the PC Server Rack. Tighten the two thumb screws to secure the sliding tray in place.

7. Run the remaining length of the Enhanced Video Cable up to the back of the server selector. Use the included cable loops to secure the Enhanced Video Cable to the PC Server Rack frame.

8. Unplug the appropriate video cable from the back of the server selector. For example, if you are installing the Enhanced Video Cable to the server installed in sliding tray 1, unplug the video cable that is plugged into the video port labeled "MON1."

9. Plug the Enhanced Video Cable into the appropriate video port on the back of the server selector.

Note: You do *not* need to remove from the PC Server Rack the precabled video cable that you are no longer using. However, if you want to remove the cable from the PC Server Rack, open the cable loops on the sliding tray's support arm by pinching the small locking tab and pulling up on the free end of the loop. Pull the unused video cable out of the cable bundle, and then remove it from the cabinet.

Connecting the Power Supply

CAUTION:
Working with electricity can be dangerous. Please take proper precautions to avoid risk of injury.[6]

ATTENTION:
Before connecting the power supply, make sure that any servers with manually switchable power supplies (for example, the PS/2 Server 85, PS/2 Server 95, and PC Server 300 models) that are installed in your PC Server Rack are set to receive 200–240 V ac current. Make sure the power supply is set correctly. Failure to do so can damage your server.

The PC Server Rack features a strain relieving power cord that is designed to help prevent accidental damage to the power distribution unit. To connect the strain relieving power cord to the power distribution unit:

1. Make sure that the power switches on the power distribution unit and the back of the server selector are set to **OFF**.

2. Open the PC Server Rack's rear cabinet door.

3. Plug the cable into the base of the power distribution unit.

   CAUTION:
   To reduce the risk of electrical shock or damage to your equipment, do not disable the power cord grounding feature. This equipment is designed to be connected to a grounded power outlet that is easily accessible and located as close as possible to the equipment. The grounding plug is an important safety feature.[11]

4. Attach the power cord to the retaining clip located at the lower left corner of the cabinet. Be sure to leave some slack in the power cord between the power distribution unit and the retaining clip.

5. Feed the remaining length of the power cord through the opening in the base of the PC Server Rack.

6. Before connecting the PC Server Rack to your power supply outlet, verify that the power supply meets the service requirements of the power distribution unit. The PC Server Rack is designed to accept power from a wall- or floor-mounted power outlet. PC Server Rack requires a 200-240 V ac, 50/60Hz, 16 A minimum house current (20 A in the United States).

7. Plug the power cord into your power supply outlet.
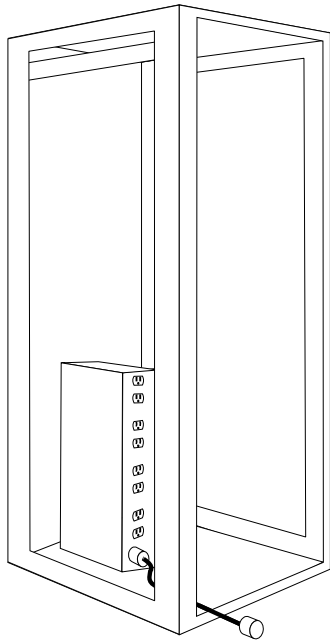
Figure 23. PC Server Rack power distribution unit and power connections

The PC Server Rack server selector allows you to use a single keyboard, mouse, and monitor with any of the servers installed in your PC Server Rack. Switching is accomplished by pressing a button on the front of the server selector or by typing a command from the keyboard. Once a server is selected, all keyboard and mouse input is directed to the selected server, and all video output from the selected server is displayed on the monitor. Because the server selector is operating-system independent, all of the servers installed in the PC Server Rack do not have to be running the same operating system.
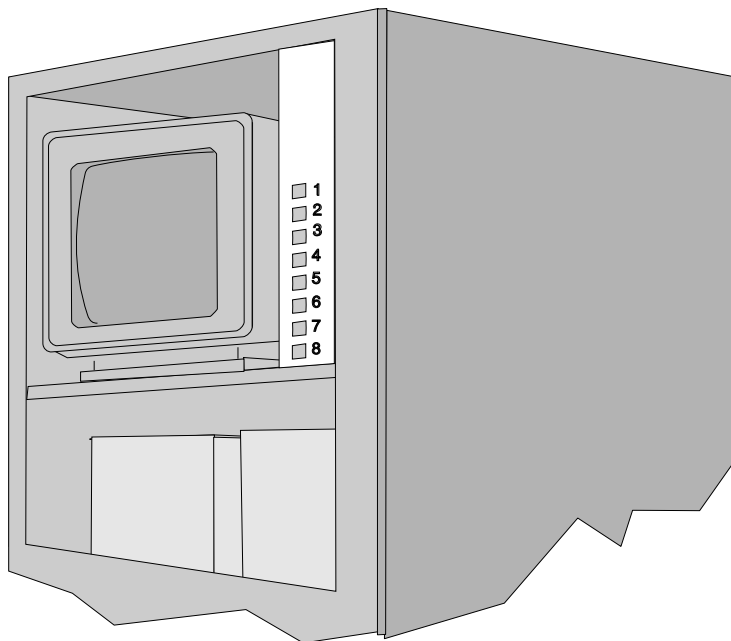
Figure 24. The server selector

Powering On the System

To power on your PC Server Rack:

1. Ensure that all installed servers are powered off before proceeding.

2. Power on the server selector.

   Open the rear cabinet door and turn the server-selector power switch to **ON**. The switch is on the back of the server selector.

3. Power on the installed servers.

ATTENTION:
You must power on the server selector before you power on the attached servers. If you power on an attached server before you power on the server selector, that server will not be recognized by the server selector.

Server Selector Startup Behavior

When the server selector is powered on, keypad button lights 1 through 8 flash in a series of patterns as follows:

- Four consecutive patterns that indicate internal memory tests.

- The fifth and sixth pattern, that indicated the microcode version in binary coded decimal format. For instructions on how to read this information, see "Displaying the Microcode Version" on page 55.

During startup, the mouse and keyboard are also identified and put into default states.

Finally, the server selector automatically switches to port 1 and lights keypad button 1. If a server is not attached to port 1, or if the server attached to port 1 is turned off, the light will blink. The server selector is now ready to receive commands.

Server Startup Behavior

When the installed servers are started, they automatically send device settings information (for the mouse, keyboard, and monitor) to the server selector. The server selector generates standard responses to these commands, enabling the servers to start successfully without actually being attached to these physical I/O devices.

If the server selector is power cycled (powered off then powered on again), the I/O device settings for the attached servers might be lost. To recover:

1. Make sure the server selector is powered on.

2. Execute the Reset Mouse command (see "Resetting the Mouse" on page 57).

3. If the Reset Mouse command restores the mouse settings successfully, perform an orderly shutdown and restart on all attached servers to restore the I/O device settings.

   If the Reset Mouse command is not successful, power cycle (power off then power on) all attached servers to restore the I/O device settings.

The server selector allows you to perform *switching* and *nonswitching* commands. Switching commands enable you to use a single keyboard, mouse, and monitor with all installed servers. Nonswitching commands enable you to gather information about the server selector microcode version, to cycle through all attached servers (called *scanning*), and to attempt to restore mouse settings for a selected server.

Information on each of the server-selector functions follows this section. The available functions are:

Print Screen	See "Printing the Screen" on page 52.
Select a Server	See "Selecting a Server" on page 53.
Display the Microcode Version	See "Displaying the Microcode Version" on page 55.
Activate Scanning Mode	See "Activating Scanning Mode" on page 56.
Reset the Mouse	See "Resetting the Mouse" on page 57.

You can initiate any server-selector command from either the server-selector keypad or from the keyboard.

- To enter commands from the server-selector keypad, press the key (or key combination) that corresponds to the command you want to execute.

- To enter commands from the keyboard:

  1. Activate the server-selector keyboard command mode.

     The keyboard command mode is activated by pressing the **Print Screen** key on the keyboard. Once this mode is activated, the server-selector lights will begin blinking in a sequential strobe pattern to indicate that the keyboard command mode is active.

  2. Press the keyboard key (or key combination) associated with the command you want to execute. See the specific command section for appropriate key combinations.

  3. Press **Enter** to execute the command.

  You can terminate keyboard command mode at any time by pressing **Esc**.

Printing the Screen

The **Print Screen** key is used to activate the server-selector keyboard command mode. The first time the Print Screen key is pressed, it enables the server selector to receive commands from the keyboard. To print your screen, press **Print Screen** twice.

Selecting a Server

Selecting a server disconnects the keyboard, mouse, and monitor from one server and connects them to another. You can select a server in one of two ways:

- Selecting with the server-selector keypad

  To use the server-selector keypad to select a server, press the numbered button that corresponds to the port number (see Figure 25) of the server you want to select.

- Selecting with the keyboard

  To use the keyboard to select a server, press **Print Screen** to activate keyboard command mode, press the port number that corresponds to the server you want to select (see Figure 25), and then press **Enter**.
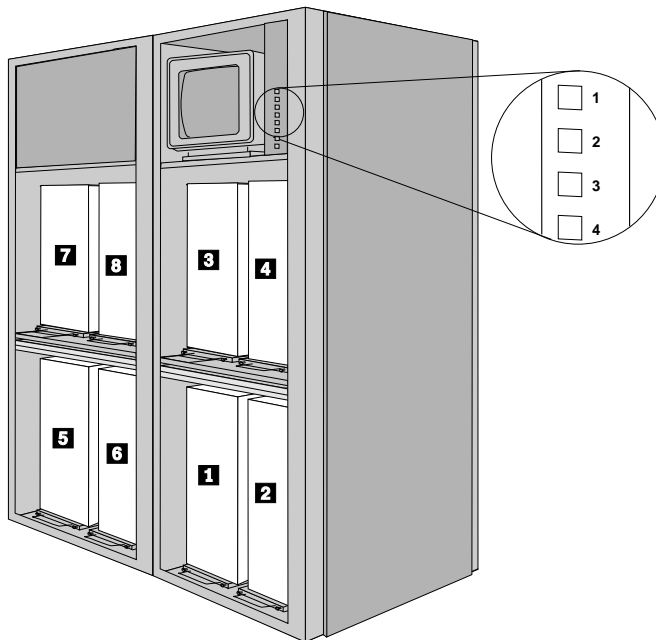
Figure 25. Server port numbers 5 through 8 are available only if a PC Server Expansion Rack is installed

Figure 26 shows the available server installation combinations in the quad and tri rack installation combinations.
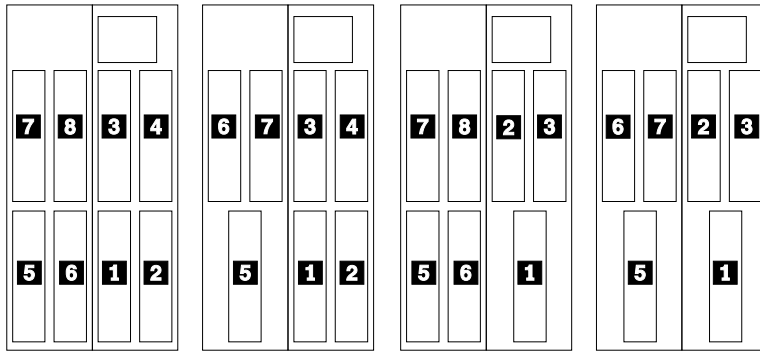
Figure 26. Server installation combinations

Once you have selected a server, the button corresponding to the selected server on the server-selector keypad lights up to signify that the keyboard, mouse, and monitor are currently connected to that server. If the button light blinks, then the selected server is not powered on. In this case, the monitor will be blank.

Notes:

1. When a server is selected, its keyboard settings will be the same as they were the last time the server was selected. For example, if the last time the server attached to port 1 was selected the Caps Lock was set to **ON**, the server selector will automatically set Caps Lock to **ON** the next time that server is selected.

2. Mouse settings are configured to match the current driver settings for the server attached to the selected port.

Displaying the Microcode Version

The microcode version is stored in erasable programmable read only memory (EPROM). To display the currently stored microcode version number, use one of the following methods:

- Using the server-selector keypad, press buttons **1** and **3** at the same time.

- Using the keyboard:

    1. Press **Print Screen**.
    2. Press **v**.
    3. Press **Enter**.

The server-selector lights display the microcode version with button lights 1 through 4. The version number is a two-digit number displayed in binary code, with lit buttons representing 1's and unlit buttons representing 0's. Figure 27 shows the two displays that are shown in sequence to denote that the server selector is using version *29* (0010 followed by 1001). Only buttons 1 through 4 are relevant to the microcode version display.
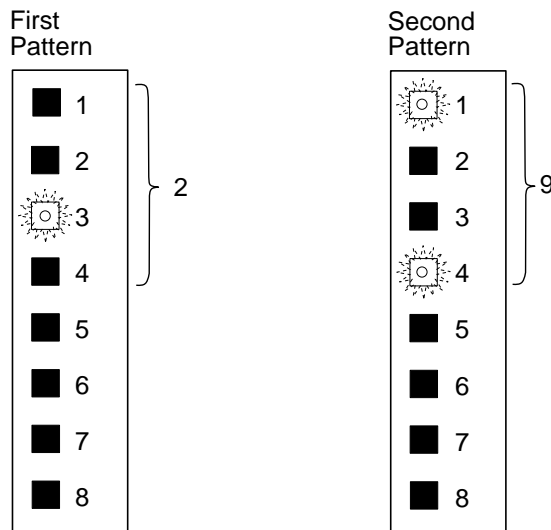
Figure 27. Version 29 displayed in binary

Activating Scanning Mode

When in scanning mode, the server selector automatically switches from port to port (cycling from low to high). Scanning continues automatically until it is interrupted by input from the user. Scanning allows you to monitor all of the installed servers without requiring you to switch manually from system to system.

When the server selector is scanning, it cycles through all attached servers sequentially, remaining connected to each powered-on server for approximately 15 seconds and then switching connection to the next server. If the server is not powered on, the connection will remain active for approximately 2 seconds before switching to the next server. The server-selector keypad light that corresponds to the currently selected server lights up as the server is scanned.

Scanning continues until you move the mouse, press any key on the keyboard, or press any button on the server-selector keypad. Any input goes to the currently selected system.

To activate scanning mode, use one of the following methods:

- Using the server-selector keypad, press buttons **1** and **2** at the same time.

- Using the keyboard:

    1. Press **Print Screen**.
    2. Press **c**.
    3. Press **Enter**.

Resetting the Mouse

The Reset Mouse command attempts to restore mouse settings for the selected computer. To attempt to reset the mouse, use one of the following methods:

- Using the server-selector keypad, press buttons **2** and **4** at the same time.

- Using the keyboard:

    1. Press **Print Screen**.
    2. Press **r**.
    3. Press **Enter**.

Appendix A. Help and Service Information

During the warranty period, you can get toll-free technical support 24 hours a day, 7 days a week, to answer any questions about your PC Server Rack (toll-free technical support available in the United States only)[*]. If you need warranty service, return or exchange is available. In addition, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Before calling, please prepare for your call by following these steps.

CAUTION:
To avoid electrical shock, unplug your computer and all attached devices from electrical outlets before performing any troubleshooting procedure.[12]

Step 1: Troubleshooting

Before calling IBM, you might want to try some or all of the following troubleshooting procedures.

1. Remove and reattach all cables.

2. Reread any software instructions; be sure software settings are correct.

3. After completing these steps, reassemble the PC Server Rack and connect the power cord.

---

[*]   Response time will vary depending on the number and nature of calls received.

Step 2: Preparing for the Service Call

To assist the technical support representative, have the following
information available:

1. Option name, description, and serial number

   This information can be found in the upper-rear right corner of
   the PC Server Rack.

2. Proof of purchase

3. Server model, serial number, and manual

4. Exact wording of the error message (if any)

5. Description of the problem

6. Hardware and software configuration information for your
   system

If possible, be at your computer. Your technical support
representative might want to walk you through the problem during
the call.

Step 3: Placing the Service Call to IBM

Use one of the following numbers:

- Within the United States, call the IBM Personal Systems
  HelpCenter at 1-800-772-2227.

- Within Canada, call 1-800-565-3344.

- Outside the United States and Canada, contact your IBM
  reseller, IBM marketing representative, or your place of
  purchase.

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: IBM 9306 PC Server Rack Enclosure

Warranty Period*: 3 Years

*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

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.

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at IBM's or your reseller's service center, to restore a Machine to good working order.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service. You also agree to ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange.

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