Rack Installation Guide

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your computer.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

⚠️ **CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.**

Contents

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Safety Instructions

Use the following safety guidelines to ensure your own personal safety and to help protect your system and working environment from potential damage. For complete safety information, see the *Product Information Guide*.

SAFETY: Rack Mounting of Systems

Observe the following precautions for rack stability and safety.

Systems are considered to be components in a rack. Thus, "component" refers to any system as well as to various peripherals or supporting hardware.

⚠ **CAUTION: Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack.**

⚠ **CAUTION: After installing components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and injure someone.**

▨ **NOTE:** Your system is safety-certified as a free-standing unit and as a component for use in a rack cabinet using the customer rack kit when both the rack cabinet and rack kit were designed for your system. The installation of your system and rack kit in any other rack cabinet has not been approved by any safety agencies. It is your responsibility to have the final combination of system and rack kit in a cabinet evaluated for suitability by a certified safety agency. The manufacturer disclaims all warranties and liability in connection with such combinations.

- System rack kits are intended to be installed in an approved rack by trained service technicians. If you install the kit in any other rack, be sure that the rack meets the specifications.

- Before working on the rack, make sure that the stabilizers are secured to the rack, and that the full weight of the rack rests on the floor. Install front and side stabilizers on a single rack or front stabilizers for joined multiple racks before working on the rack.

- Always load the rack from the bottom up, and load the heaviest item in the rack first.

- Make sure that the rack is level and stable before extending a component from the rack.

- Do not overload the AC power supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.

- Ensure that proper airflow is provided to components in the rack.

- Do not step on or stand on any system/component when servicing other systems/components in a rack.

Installation Instructions

This installation guide provides instructions for trained service technicians installing one or more systems in an open-frame relay rack or in a rack cabinet. The RapidRails™ rack kit can be installed in all the system manufacturer's rack cabinets without tools, and the VersaRails™ rack kit can be installed in most industry-standard rack cabinets. The procedures for installing both RapidRails and VersaRails rack kits are similar. One rack kit is required for each system to be installed in the rack cabinet.

This guide includes procedures for the following rack kits:

- RapidRails kit in a four-post rack cabinet
- VersaRails kit in a four-post rack cabinet
- Two-post kit (installed in either center-mount or flush-mount configuration)

Before You Begin

Before you begin installing your system in the rack, carefully read "Safety Instructions," found earlier in this guide, as well as the safety instructions found in your *Product Information Guide* for additional information.

⚠ **CAUTION: When installing multiple systems in a rack, complete all of the procedures for the current system before attempting to install the next system.**

⚠ **CAUTION: Rack cabinets can be extremely heavy and move easily on their casters. They do not have brakes. Use extreme caution while moving the rack cabinet. Retract the leveling feet when relocating the rack cabinet. Avoid long or steep inclines or ramps where loss of cabinet control may occur. Extend the leveling feet for support and to prevent the cabinet from rolling.**

✐ **NOTE:** For instructions on installing the system itself, see "Installing the System in the Rack."

Important Safety Information

Observe the safety precautions in the following subsections when installing your system in the rack.

⚠ **CAUTION: You must strictly follow the procedures in this document to protect yourself as well as others who may be involved. Your system may be very large and heavy and proper preparation and planning are important to prevent injury to yourself and to others. This precaution becomes increasingly important when systems are installed high up in the rack.**

⚠ **CAUTION: Do not install rack kit components designed for another system. Use only the rack kit for your system. Using the rack kit for another system may result in damage to the system and personal injury to yourself and to others.**

Rack Requirements for VersaRails

⊘ **NOTICE:** The VersaRails rack kit is intended to be installed by trained service technicians in a rack that meets the specifications of American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92, International Electrotechnical Commission (IEC) 297, and Deutsche Industrie Norm (DIN) 41494. One rack kit is required for each system that is installed in a rack.

Four-Post Rack Installation

Before attempting this installation, read through this entire procedure carefully.

Rack Stabilizer Feet

⚠ **CAUTION: Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack.**

The stabilizer feet help prevent the rack from tipping over. See the documentation provided with the rack cabinet for instructions on installing and anchoring the stabilizer feet.
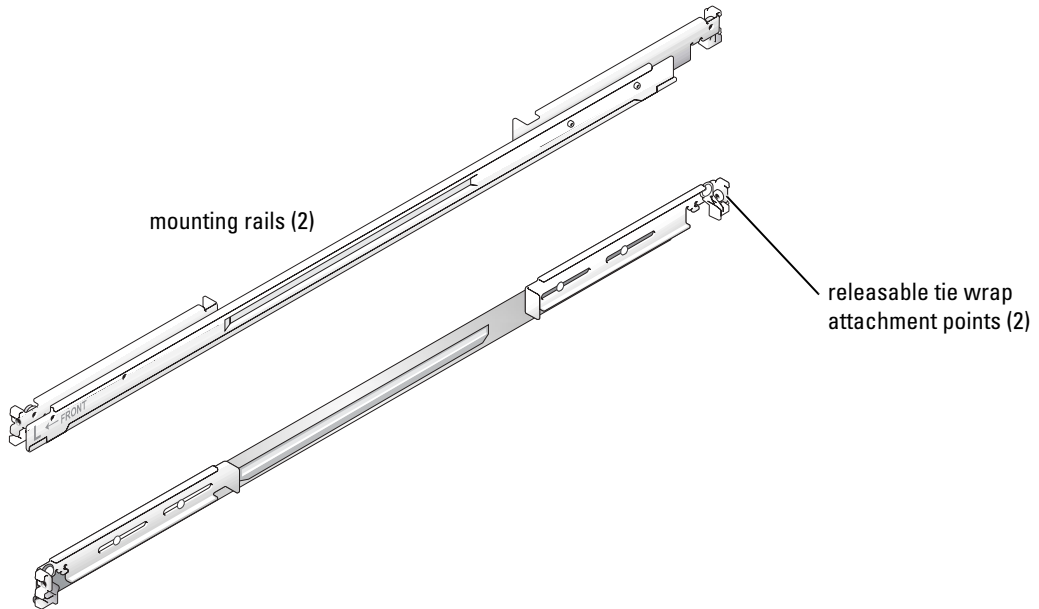
Recommended Tools and Supplies

You may need the following items to install the system in a four-post rack cabinet:

- #2 Phillips screwdriver
- Masking tape or a felt-tip pen, for use in marking the mounting holes to be used

RapidRails Rack Kit Contents

- One pair of RapidRails mounting rails
- Releasable tie wraps (2) (not shown in Figure 1-1)

Figure 1-1.   RapidRails Rack Kit Contents

mounting rails (2)

releasable tie wrap
attachment points (2)

VersaRails Rack Kit Contents

- One pair of VersaRails mounting rails
- 10-32 x 0.5-inch flange-head Phillips screws (8)
- Releasable tie wraps (2) (not shown in Figure 1-2)

NOTE: The nonmetric screws described in illustrations and in procedural steps are identified by size and number of threads per inch. For example, a #10 Phillips-head screw with 32 threads per inch is identified as a 10-32 screw.

Figure 1-2.   VersaRails Rack Kit Contents

mounting rails (2)

releasable tie wrap
attachment points (2)

10-32 x 0.5-inch flange-
head Phillips screws (8)

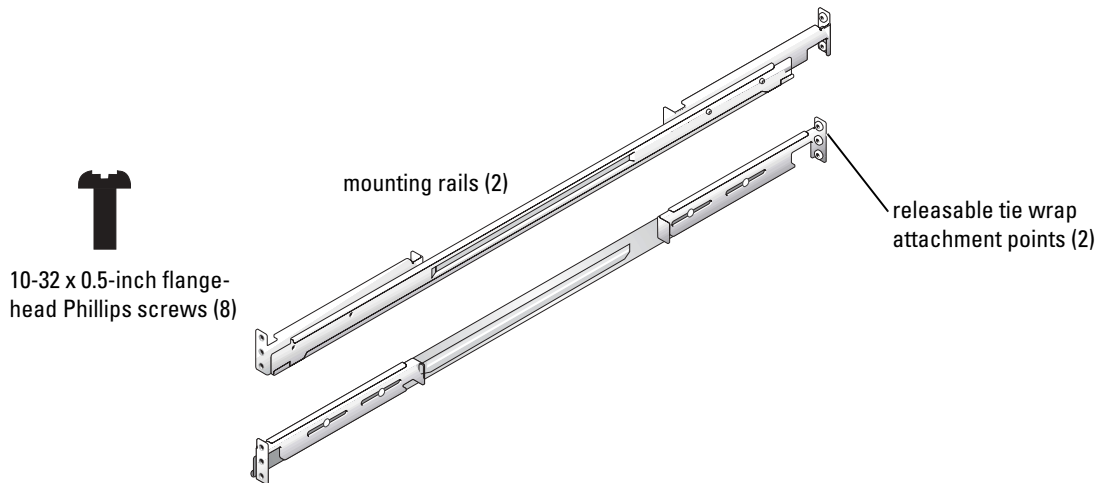## Installation Tasks

Installing a rack kit involves performing the following tasks (described in detail in subsequent sections) in their numbered order:

1 Removing the rack doors

2 Marking the rack

3 Installing the mounting rails in the rack

    •   RapidRails installation

    •   VersaRails installation

    •   Static Rails Installation

4 Installing the system in the rack

5 Routing cables and securing with releasable tie wraps

6 Replacing the rack doors

NOTE: Three procedures are provided for task 3. These procedures are for the RapidRails kit, the VersaRails kit, and the Static Rail kit.

Removing the Rack Doors

See the procedures for removing doors in the documentation provided with your rack cabinet.

⚠ **CAUTION: Because of the size and weight of the rack cabinet doors, never attempt to remove or install them by yourself.**

⚠ **CAUTION: Store the doors where they will not injure someone if the doors accidently fall over.**
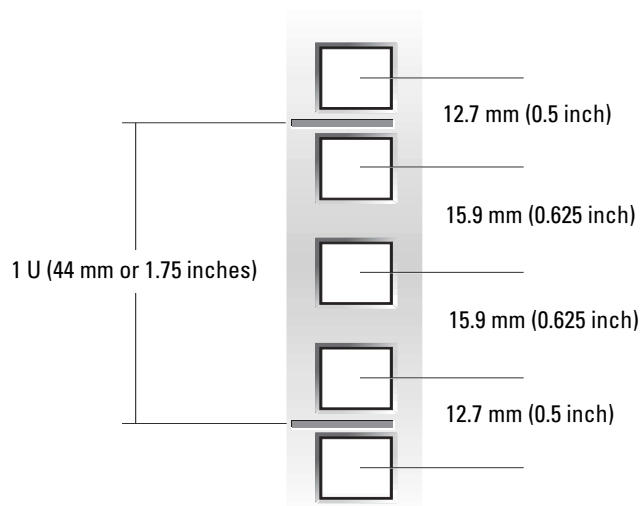
Marking the Rack

For a 1-U system, you must allow 1 U (44 mm, or 1.75 inches) of vertical space for each system you install in the rack.

Rack cabinets that meet EIA-310 standards have an alternating pattern of three holes per rack unit with center-to-center hole spacing (beginning at the top hole of a 1-U space) of 15.9 mm, 15.9 mm, and 12.7 mm (0.625 inch, 0.625 inch, and 0.5 inch) for the front and back vertical rails (see Figure 1-3). Rack cabinets may have round or square holes.

📝 **NOTE:** The vertical rails may be marked by horizontal lines and numbers in 1-U increments. If you want, you can make a note of the number marking on the rack's vertical rail. It is not necessary to mark or place tape on the rack.

Figure 1-3.   One Rack Unit

⚠ **CAUTION: If you are installing more than one system, install the mounting rails so that the first system is installed in the lowest available position in the rack.**
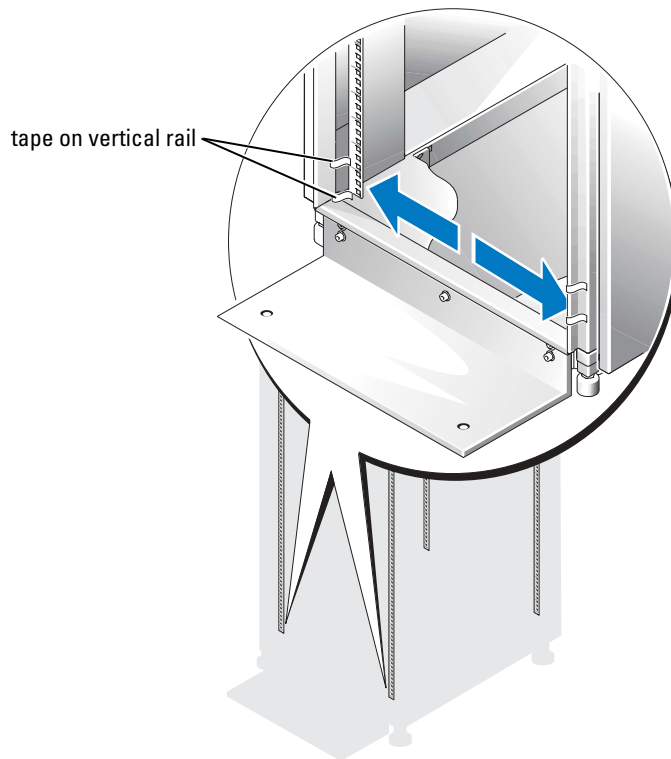
To mark the rack, perform the following steps:

1   Place a mark (or tape) on the rack's front vertical rails where you want to locate the bottom of the system you are installing in the rack.

    The bottom of each 1-U space is at the middle of the narrowest metal area between holes (marked with a horizontal line on some rack cabinets—see Figure 1-4).

2   Place a mark 44 mm (1.75 inches) above the original mark you made (or count up three holes in a rack that meets EIA-310 standards) and mark the rack's front vertical rails with a felt-tipped pen or masking tape (if you counted holes, place a mark just above the top hole). This mark or piece of tape indicates where the system's upper edge will be located on the vertical rails (see Figure 1-4).

Figure 1-4.   Marking the Vertical Rails

tape on vertical rail

Installing the Mounting Rails in the Rack

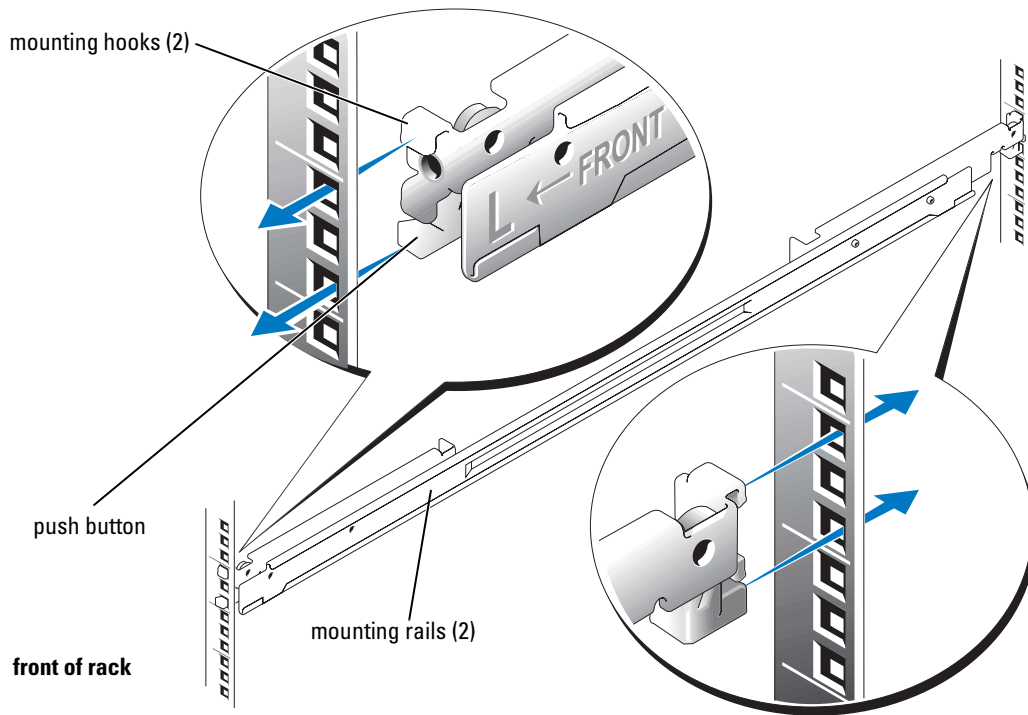**Installing the RapidRails Mounting Rails**

1 At the front of the rack cabinet, position one of the RapidRails mounting rails so that its mounting-bracket flange fits between the marks or tape you placed (or numbered location) on the vertical rails (see Figure 1-5).

   The top mounting hook on the front mounting-bracket flange should enter the top hole between the marks you made on the vertical rails.

2 Push the mounting rail forward until the mounting hooks enter their square holes, and then push down on the mounting-bracket flange until the mounting hooks seat and the push button pops out and clicks (see Figure 1-5).

3 At the back of the cabinet, pull back on the mounting-bracket flange until the mounting hooks enter their square holes, and then push down on the flange until the mounting hooks seat and the push button pops out and clicks.

4 Repeat step 1 through step 3 for the mounting rail on the other side of the rack.

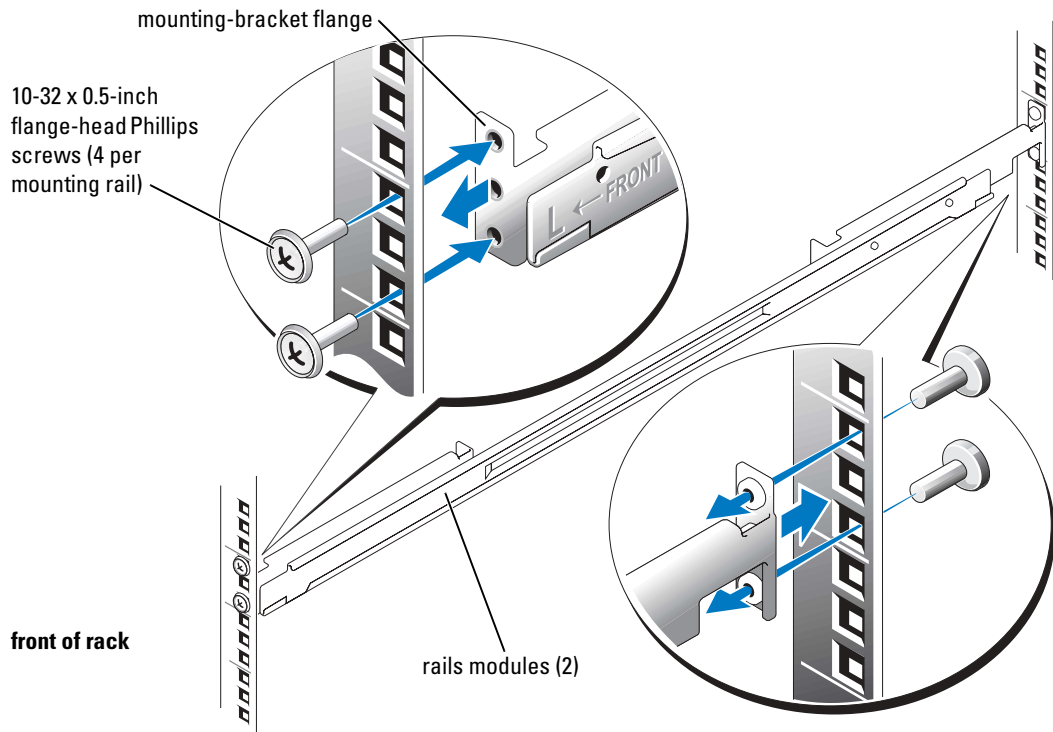5 Ensure that the mounting rails are mounted at the same vertical position on both sides of the rack.

Figure 1-5. Installing the RapidRails Mounting Rails

mounting hooks (2)

L ← FRONT

push button

mounting rails (2)

front of rack

Installing the VersaRails Mounting Rails

1. At the front of the rack cabinet, position one of the VersaRails mounting rails so that its mounting-bracket flange fits between the marks (or numbered location) on the vertical rails (see Figure 1-6).

   The three holes on the front of the mounting-bracket flange should align with the holes between the marks you made on the front vertical rail.

2. Install two 10-32 x 0.5-inch flange-head Phillips screws in the mounting-bracket flange's top- and bottom-holes to secure the mounting rail to the front vertical rail.

3. At the back of the cabinet, pull back on the mounting-bracket flange until the mounting holes align with their respective holes on the back vertical rail.

4. Install two 10-32 x 0.5-inch flange-head Phillips screws in the back mounting-bracket flange's top- and bottom-holes to secure the mounting rail to the back vertical rail.

5. Repeat step 1 through step 4 for the mounting rail on the other side of the rack.

6. Ensure that the mounting rails are mounted at the same position on the vertical rails on each side of the rack.

Figure 1-6. Installing the VersaRails Mounting Rails

mounting-bracket flange

10-32 x 0.5-inch flange-head Phillips screws (4 per mounting rail)
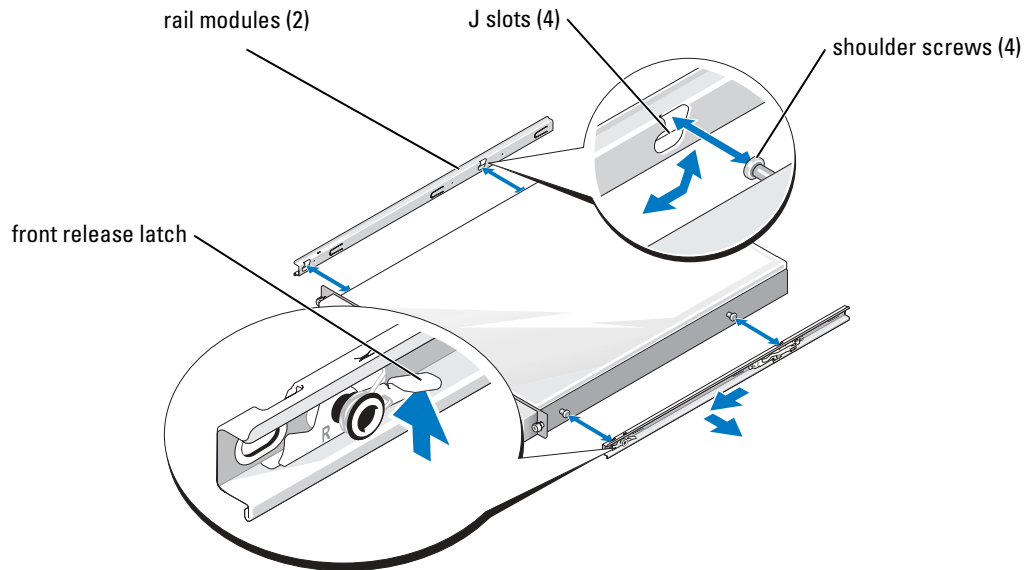
L ← FRONT

front of rack

rails modules (2)

Installing and Removing Chassis Static Rail Modules

NOTE: You do not need to remove the optional front bezel to install or remove the chassis static rail modules from the chassis.

1 To install the rails, locate the J slots on both rails. Locate the two corresponding shoulder screws that are on both sides of the chassis toward the front and midpoint (see Figure 1-7).

2 To attach the rails to the chassis, align the two J slots on the rail modules with the shoulder screws. Position each rail directly below the two corresponding shoulder screws (see Figure 1-7).

3 To seat the rails, pull up on the front latches attached to the front of each rail. Pull up and back on each rail, snapping them into place on the chassis.

4 To remove the rails from the chassis, pull up on the front latches to release each rail.

5 Unseat the rails from the J slots and remove the rails from the chassis.

Figure 1-7.   Installing and Removing Static Rail Modules

rail modules (2)   J slots (4)   shoulder screws (4)
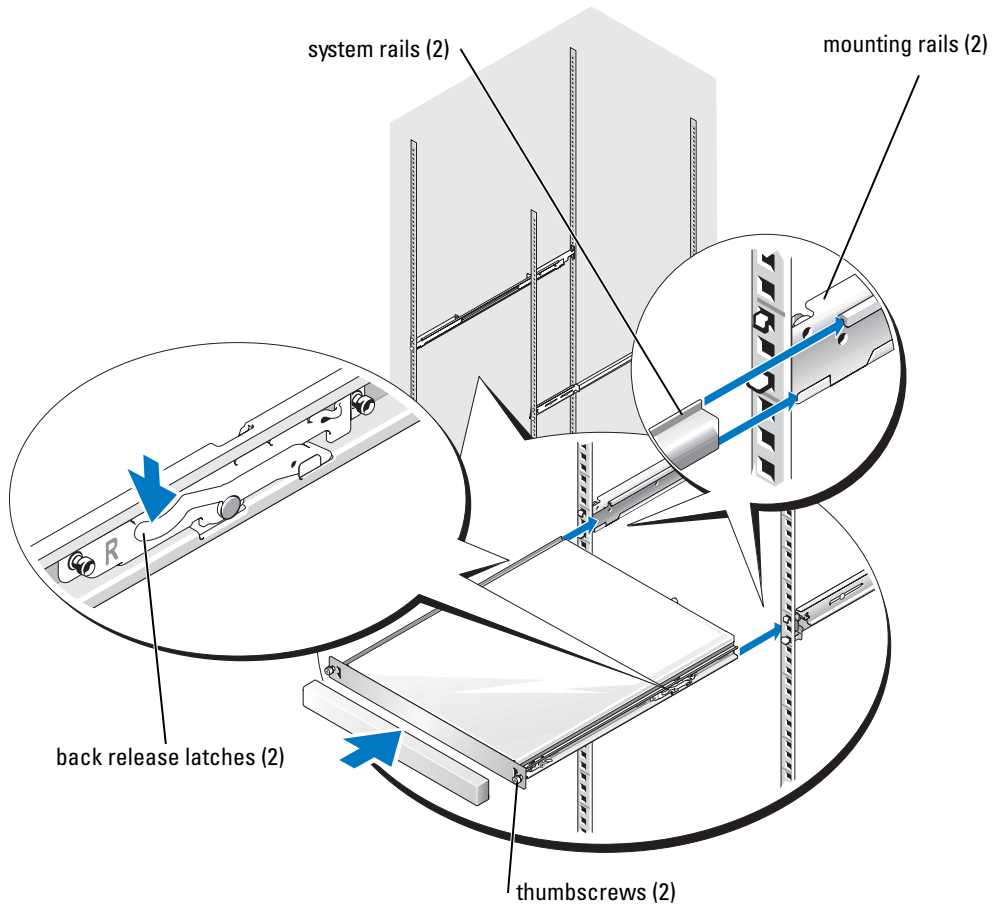
front release latch

Installing the System in the Rack

⚠ **CAUTION: If you are installing more than one system, install the first system in the lowest available position in the rack.**

⚠ **CAUTION: Because of the size and weight of the system, never attempt to install the system in the mounting rails by yourself.**

To install the system on the rack, perform the following procedure:

1 From the front of the system, lift the chassis into position so that the side rails are aligned with the mounting rails on the rack.

Figure 1-8.   Installing the System in the Rack

system rails (2)

mounting rails (2)

back release latches (2)

thumbscrews (2)

2   Working from right to left, position the chassis on the mounting rails and slide back (see Figure 1-8).

3   Push the chassis back into the mounting rails until the system stops (see Figure 1-8).

4   Secure both thumbscrews on the front panel of the chassis.

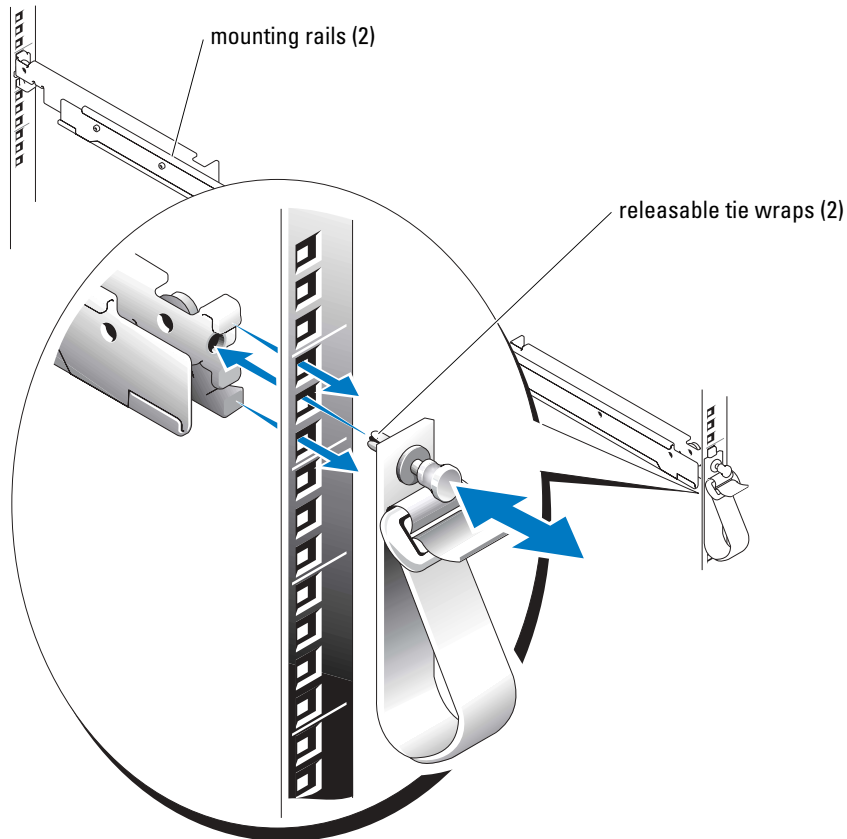**NOTE:** Figure 1-8 applies to the RapidRails, VersaRails, and two-post rack kits.

Installing the Releasable Tie Wraps

The two releasable tie wraps are used to secure your system's cables to the mounting rails.

1 Locate the releasable tie wrap attachment points located on the two back mounting-bracket flanges (see Figure 1-9).

Figure 1-9.   Installing the Releasable Tie Wraps

mounting rails (2)

releasable tie wraps (2)

2 Push the tie wrap's fastener through the attachment point.

3 Push the tie wrap's plunger until it snaps to secure the tie wrap to the mounting rail.

4 Using the releasable tie wrap, secure your system's cables to the mounting rail.

Removing the System From the Rack

To remove the system from the rack, perform the following procedure:

NOTE: You do not need to remove the optional front bezel to install or remove the system from the rack.

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Disengage the both thumbscrews on the front panel of the chassis.

3 On either side of the system, locate the back release latches.

4 Pull the system out of the rack until it stops, and then push down on both release levers to actuate the side-rail safety catches (see Figure 1-8).

5 Pull the system completely out of the rack.

Replacing the Rack Doors

See the procedures for replacing doors in the documentation provided with your rack.

CAUTION: Because of the size and weight of the rack cabinet doors, never attempt to remove or install them by yourself.

This completes the rack installation of your system in a four-post rack cabinet.

Two-Post Rack Installation

The two-post rack kit is used to install a system in a two-post, open-frame relay rack, such as those found in telecommunications equipment facilities. Both 7.62-cm or 15.24-cm (3-inch and 6-inch) wide two-post racks with universal hole spacing or wide hole spacing are accommodated. You can install this kit in a center-mount or a flush-mount configuration.

You must properly secure the two-post relay rack to the floor, the ceiling or upper wall, and where applicable, to adjacent racks, using floor and wall fasteners and bracing specified or approved by the rack manufacturer or by industry standards. See the two-post rack manufacturer's documentation for warnings before attempting this installation.

CAUTION: Do not attempt to install the system into a two-post, open-frame relay rack that has not been securely anchored in place. Damage to the system and personal injury to yourself and to others may result.

See "Safety Instructions" for additional safety information regarding rack installation.

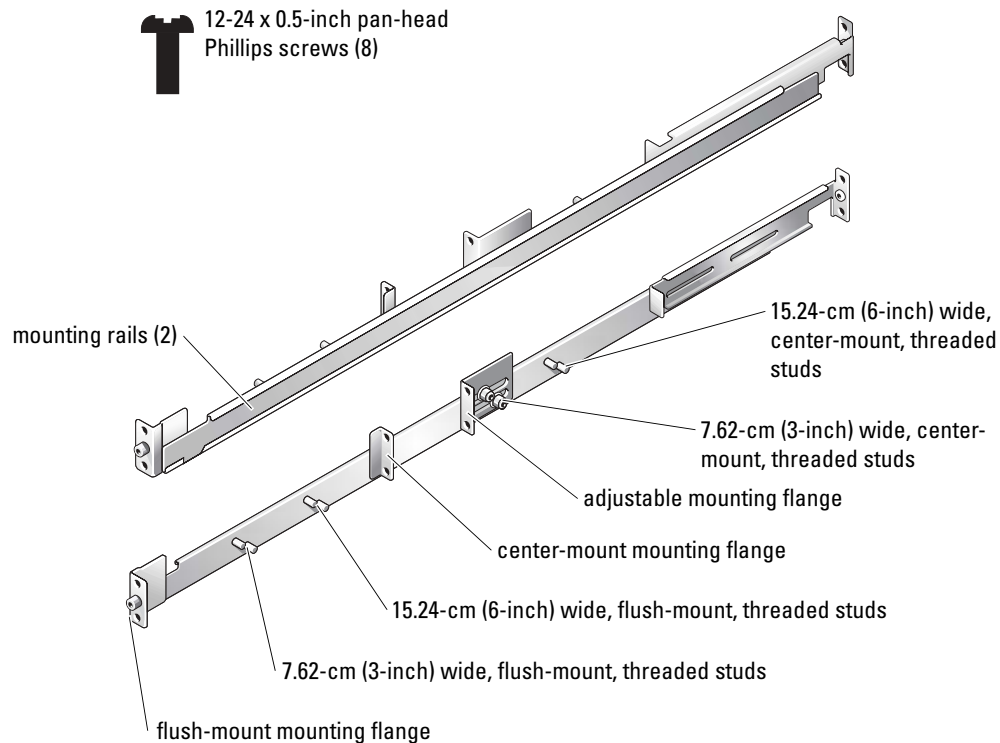## Recommended Tools and Supplies

- #2 Phillips screwdriver
- 3/8-inch wrench or nut driver (if changing bracket to flush-mount configuration)
- Masking tape or felt-tip pen to mark the mounting holes

Rack Kit Contents

The two-post rack kit includes (see Figure 1-10):

- One pair of mounting rails
- 12-24 x 0.5-inch pan-head Phillips screws (8)
- Releasable tie wraps (2) (not shown in Figure 1-10)

Figure 1-10.   Two-Post Rack Kit Components

Installation Tasks

Installing a two-post rack kit includes performing the following tasks in order:

1   Marking the rack
    • Universal-hole spacing rack
    • Wide-hole spacing rack
2   Installing the mounting rails in the rack
    • Center-mount installation
    • Flush-mount installation
3   Installing the system in the rack
4   Routing cables
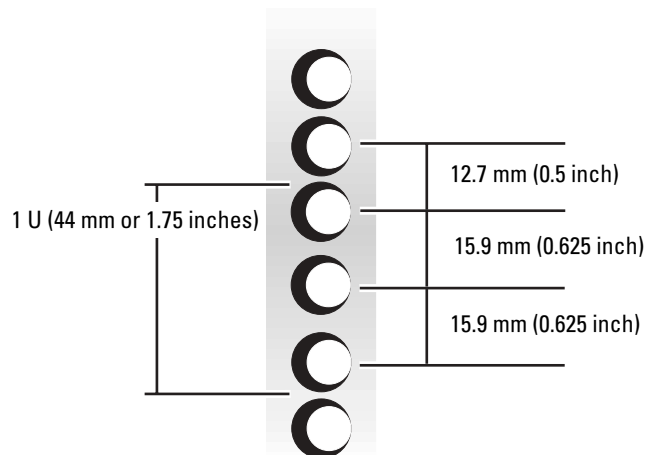
Marking the Rack

You must allow 1 U (44 mm, or 1.75 inch) of vertical space for each system that you install in the two-post rack.

Universal-Hole Spacing Racks

Racks with universal-hole spacing have an alternating pattern of three holes per rack unit with center-to-center hole spacing (beginning at the top hole of a 1-U space) of 15.9 mm, 15.9 mm, and 12.7 mm (0.625 inch, 0.625 inch, and 0.5 inch) for the front and back vertical column of holes (see Figure 1-11).
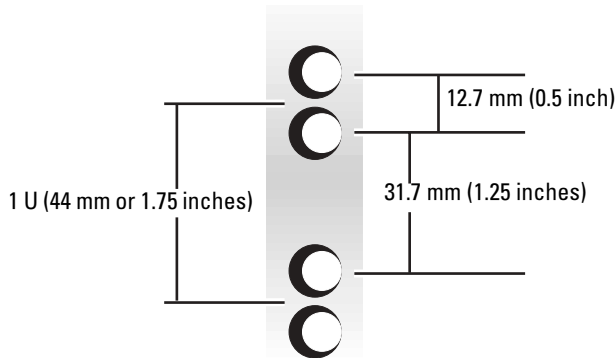
Figure 1-11.   Two-Post, Open-Frame Relay Rack Universal-Hole Spacing

Wide-Hole Spacing Racks

Racks with wide-hole spacing have an alternating pattern of two holes per rack unit with center-to-center hole spacing (beginning at the top hole of a 1-U space) of 31.7 mm and 12.7 mm (1.25 inches and 0.5 inch) for the front and back vertical columns of holes (see Figure 1-12).

Figure 1-12.   Two-Post, Open-Frame Relay Rack Wide-Hole Spacing

To mark the rack, perform the following steps:

1 Place a mark on the rack's front vertical rails where you want to locate the bottom of the system you are installing in the two-post rack.

   The bottom of each 1-U space is at the middle of the narrowest metal area between holes.

   📝 **NOTE:** If your rack has wide-hole spacing, go to step 3.

2 Place a mark 44 mm (1.75 inches) above the original mark you made (or count up three holes in a rack with universal-hole spacing) (see Figure 1-11).

   Each 1 U (44 mm, or 1.75 inches) of vertical space on a rack with universal-hole spacing has three holes with center-to-center spacing between holes (beginning at the top of a 1-U space) of 15.9 mm, 15.9 mm, and 12.7 mm (0.625 inch, 0.625 inch, and 0.5 inch) (see Figure 1-11).

   📝 **NOTE:** If your rack has universal-hole spacing, you have completed the procedure for marking the rack.

3 Place a mark 44 mm (1.75 inches) above the original mark you made (or count up to the next hole in the rack with wide-hole spacing (see Figure 1-12).

   Each 1 U (44 mm, or 1.75 inches) of vertical space on a rack with wide-hole spacing has two holes with center-to-center spacing between holes (beginning at the top of a 1-U space) of 31.7 mm (1.25 inches) (see Figure 1-12).

Installing the Mounting Rails

You can install the mounting rails in a two-post, open-frame rack having either universal-hole spacing (see Figure 1-11) or wide-hole spacing (see Figure 1-12). You can install the mounting rails in either a flush-mount or center-mount configuration.
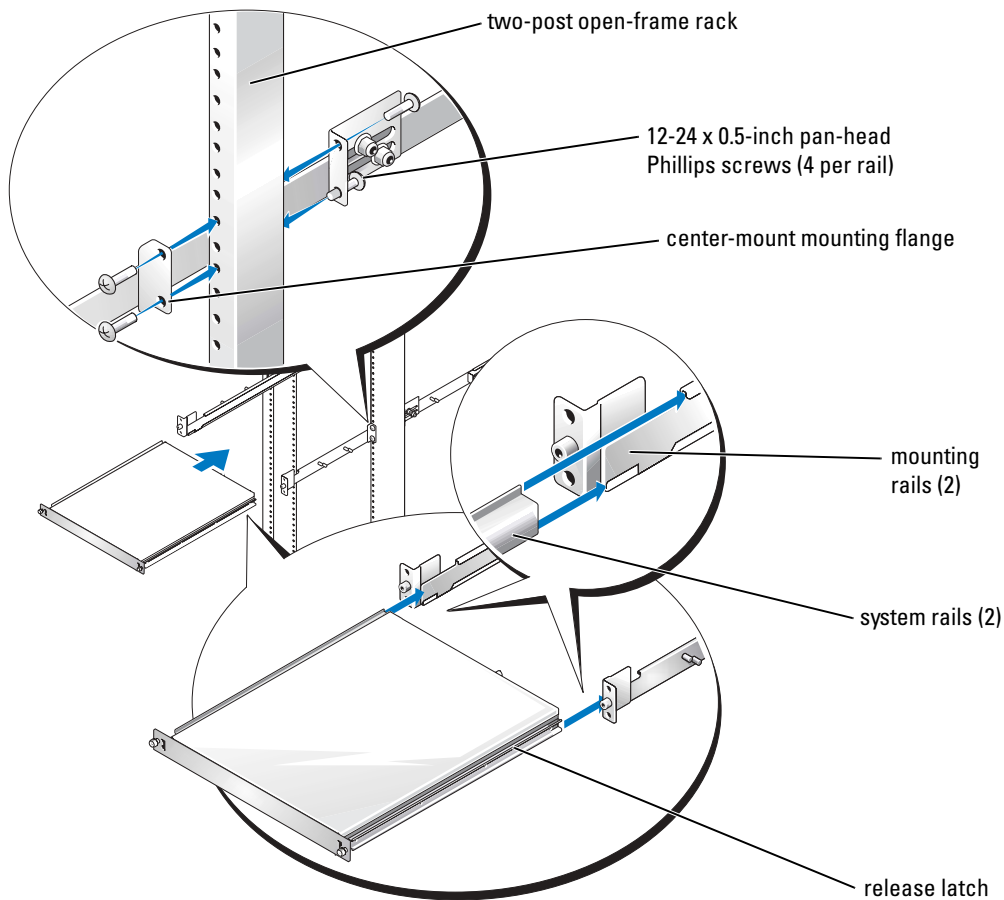
⚠ **CAUTION: Do not install another system using this rack kit. Use only the rack kit intended for your system. Using the rack kit for another system may result in damage to the system and personal injury to yourself and to others.**

Center-Mount Installation

The two-post rack kit is shipped with the brackets configured for a 7.62-cm (3-inch) wide center-mount installation. See Figure 1-10 for mounting rail components. To complete the installation, perform the following steps:

1 Locate the right mounting rail and push the adjustable mounting bracket toward the back of the mounting rail (see Figure 1-13).

2 Position the right mounting rail in the two-post rack at the location you marked, push the center-mount adjustable mounting bracket forward against the vertical two-post rack, and secure the mounting flange and adjustable mounting bracket to the rack with four 12-24 x 0.5-inch pan-head Phillips screws (see Figure 1-13).

3 Repeat step 1 and step 2 to install the left mounting rail in the rack.

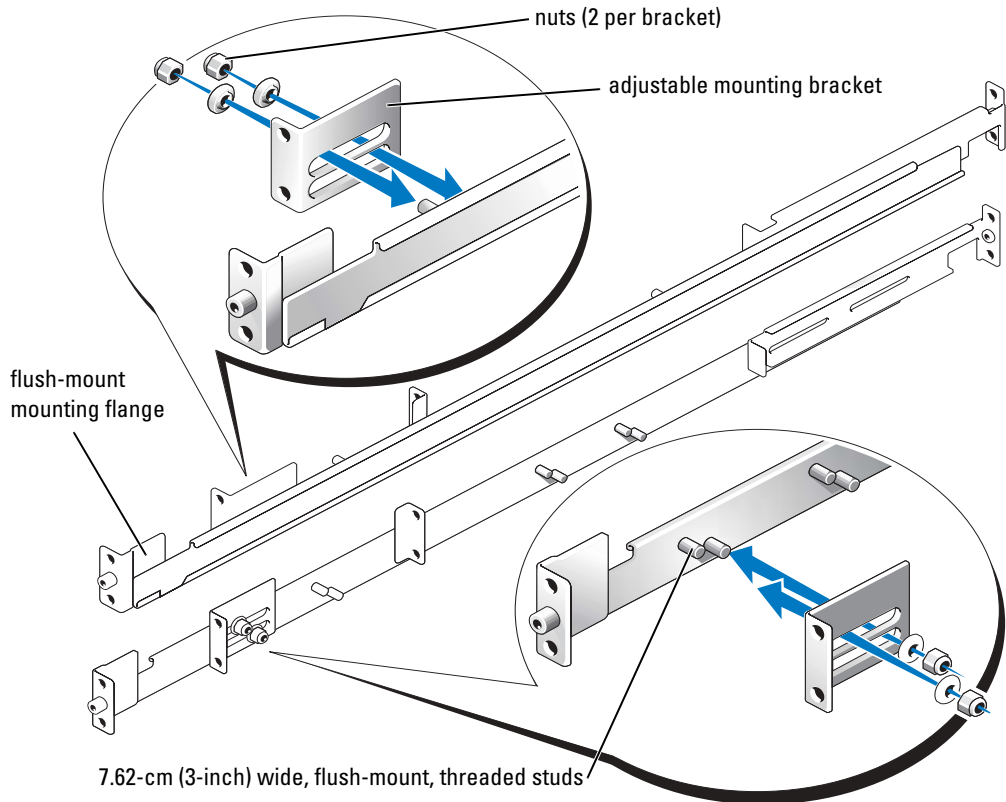**Figure 1-13. Installing the Mounting Rails for Center-Mount Configuration**

two-post open-frame rack

12-24 x 0.5-inch pan-head
Phillips screws (4 per rail)

center-mount mounting flange

mounting
rails (2)

system rails (2)

release latch

Flush-Mount Installation

The two-post rack kit is shipped with the brackets configured for a 7.62-cm (3-inch) wide center-mount installation. See Figure 1-10 for mounting rail components. To prepare the mounting rails for flush-mount installation in the two-post rack, perform the following steps:

1   Locate the two mounting rails and place them side by side on a smooth work surface, with the front ends of the mounting rails toward you (see Figure 1-14).

2   Using a 3/8-inch wrench or nut driver, remove two nuts from the adjustable mounting bracket (see Figure 1-14).

3   Remove the bracket and then place the bracket on either the 7.62-cm or 15.24-cm (3-inch or 6-inch) wide flush-mount threaded studs (see Figure 1-14).

4 Using the two nuts that you removed in step 2, tighten the nuts finger tight to secure the adjustable mounting bracket (see Figure 1-14).

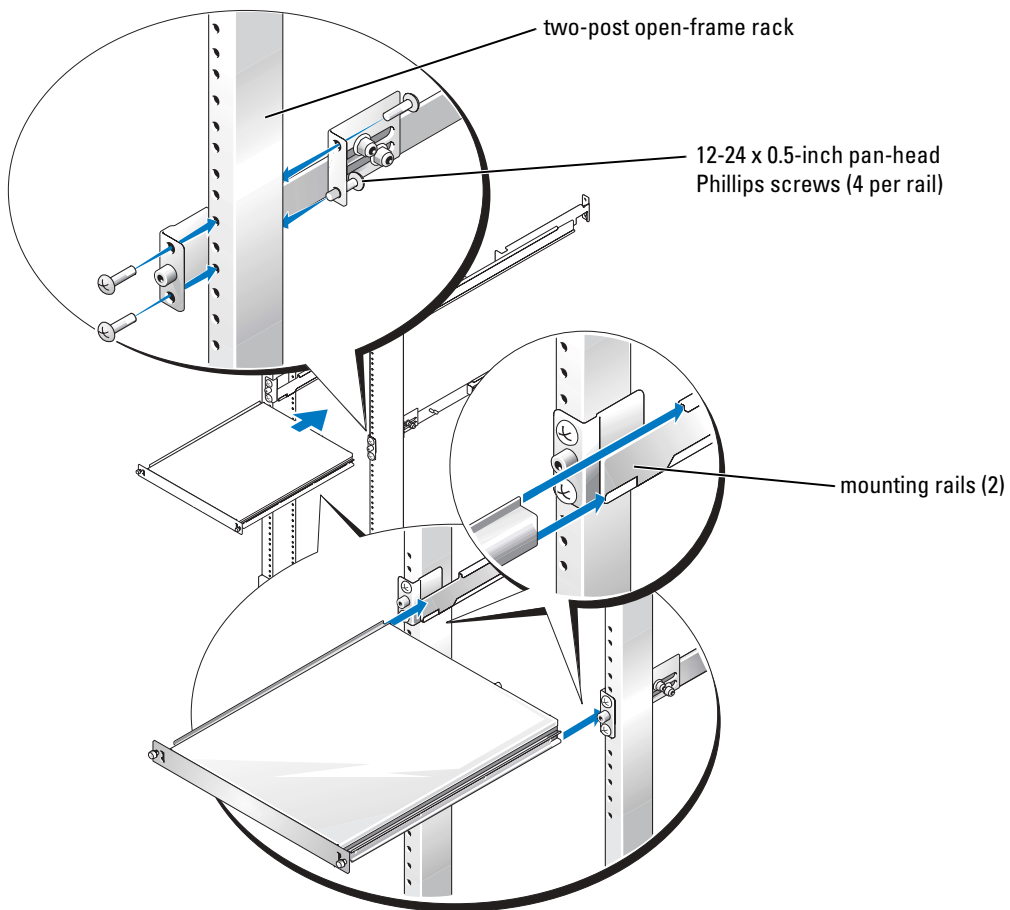**5** Repeat step 2 through step 4 to configure the other mounting rail.

Figure 1-14.   Configuring the Adjustable Mounting Bracket for Flush-Mount Installation

nuts (2 per bracket)

adjustable mounting bracket

flush-mount mounting flange

7.62-cm (3-inch) wide, flush-mount, threaded studs

6 Holding the left mounting rail at the location you marked, position the flush-mount mounting flange against the front of the vertical two-post rack and secure it to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 1-15).

7 Slide the adjustable-mounting bracket so that it is against the back of vertical two-post rack and secure it to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 1-15).

8 Repeat step 6 and step 7 to install the right mounting rail in the rack.

9 Using a 3/8-inch wrench or nut driver, tighten the nuts on the adjustable mounting brackets on both mounting rails.

Figure 1-15.   Installing the Mounting Rails for Flush-Mount Configuration

two-post open-frame rack

12-24 x 0.5-inch pan-head
Phillips screws (4 per rail)

mounting rails (2)

Installing the System in the Rack

For instructions, see "Installing the System in the Rack" in "Four-Post Rack Installation."

Installing the Releasable Tie Wraps

For instructions, see "Installing the Releasable Tie Wraps" in "Four-Post Rack Installation."

You have completed the installation of the rack kit in a two-post rack.

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