

IBM iDataPlex Cluster Solution



Installation and Service Guide

IBM iDataPlex Cluster Solution



Installation and Service Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, "Getting help and technical assistance," on page 47 and Appendix D, "Notices," on page 53.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安裝本產品之前，請仔細閱讀 **Safety Information**
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *IBM Rack Safety Information* document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the *IBM Rack Safety Information* document under “Statement 1.”

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Statement 1:**CAUTION:**

To ensure safety, all configurations of the rack cabinet must be certified by a nationally recognized testing laboratory in order to verify compliance with country-specific safety regulations. This process ensures that the end product remains safe for the operator and service personnel under normal and foreseeable misuse conditions.

Statement 2:**DANGER**

- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- Always install servers and optional devices starting from the bottom of the rack cabinet.
- Always install the heaviest devices in the bottom of the rack cabinet.

Statement 4:



Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

DANGER

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	To Disconnect:
<ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors4. Attach power cords to outlet.5. Turn device ON.	<ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlet.3. Remove signal cables from connectors.4. Remove all cables from devices.

Statement 6:



CAUTION:

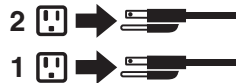
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

Statement 7:



CAUTION:

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



Statement 8:



DANGER

- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Statement 9:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 12:



CAUTION:

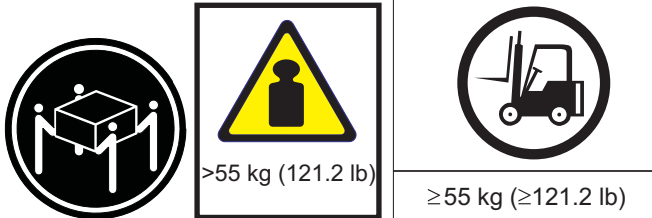
See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

Statement 13:



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



Chapter 1. System overview

This document contains site preparation, requirements, and installation instructions for the IBM® iDataPlex Rack Type 7825 and many of the common optional devices that you can install in the rack cabinet. Always read the documentation that comes with your server or optional device for detailed installation instructions.

The IBM iDataPlex Solution is a 43U high 120 cm (47.25 in.) wide rack cabinet that can hold up to 84 preconfigured 1U type servers, ac line voltage power distribution units (PDU), optional rack management hardware, and switch solutions.

Important: To help maintain proper cooling for all components installed in the rack, make sure that fillers are installed over all unoccupied bays.

This documentation might be updated occasionally to include information about new features, a translated version of the documentation might be available in your language, or technical updates might be available to provide additional information that is not included in this documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to <http://www.ibm.com>
2. Under **Support & downloads**, go to the **Support by product** menu and click **Systems and servers**.
3. In the **Product support** box, click **System x**.
4. From the **Product family** menu, select **System x iDataPlex Solution** and click **Go**.
5. To view iDataPlex Solution documentation, click **Documentation** in the **Support & downloads** box. To view available device drivers and downloads, click **Downloads**.

The IBM Documentation CD of iDataPlex Rack Type 7825

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

Hardware and software requirements

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

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

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader

or xpdf. The Documentation Browser automatically detects the regional settings in your computer and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

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

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
 - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`
where *e* is the drive letter of the CD or DVD drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:
`sh runlinux.sh`

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

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

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

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

Related documentation

This *Installation and User's Guide* provides general information about the rack, including information about planning and how to get help. In addition to this document, the printed *Important Notices* document and the following documentation is provided in Portable Document Format (PDF) on the IBM *Documentation* CD:

- *Rack Safety Information*

This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Rack Safety Information* document.

- *Warranty and Support Information*

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

- *IBM System Cluster 1350 Installation and Service Guide*

This document contains information about Cluster 1350 racks. To view this document, or to find additional technical information and download device drivers and other updates, complete the following steps:

1. Go to <http://www.ibm.com>
2. Under **Support & downloads**, go to the **Support by product** menu and click **Systems and servers**.
3. In the **Product support** box, click **System x**.
4. From the **Product family** menu, select **Cluster 1350** and click **Go**.
5. To view System Cluster 1350 documentation, click **Documentation** in the **Support & downloads** box. To view available device drivers and downloads, click **Downloads**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Chapter 2. Site preparation and requirements

This chapter contains information about preparing the site and the requirements for installing the iDataPlex Rack Type 7825 cabinet.

Important: The information in this chapter applies only to the IBM iDataPlex Rack Type 7825. If your IBM cluster solution contains an IBM 42U Enterprise Rack (machine type 1410 and model 1410-4RX) or an IBM 25U Enterprise Rack (machine type 1410 and model 1410-2RX), see the *IBM System Cluster 1350 Installation and Service Guide* for the applicable specifications, installation procedures, cabinet placement instructions, and cabling guidelines.

Site preparation overview

Before you unpack or install the rack cabinet, complete the following tasks:

- Understand the rack cabinet specifications and requirements.
- Measure all door openings, ensuring that they are a minimum of 2110 mm (83 in.) high and 851 mm (33.5 in.) wide.
- Prepare a layout of the rack cabinet or suite of rack cabinets.
- Prepare the physical site (location) where you will install the rack cabinet.
- Read “Unpacking the rack” on page 17.

Physical site planning includes determining the following factors:

- Floor area that is required by the equipment
- Floor-load capacity
- Space that is needed for future expansion
- Location of columns or other unmovable building structures
- Power and environmental requirements

Create a floor plan to check for clearance problems. If necessary, make a full-scale template of the rack cabinet and carry it along the access route to check for potential clearance problems through doorways and passageways, around corners, and in elevators.

Remember to provide space for storage cabinets, card files, desks, communication facilities, daily storage of tapes, and other supplies.

Before you install the rack, prepare the site by making sure that the following requirements are met:

- There is enough space for the rack cabinet to pass safely by any pre-existing equipment or facility fixtures.
- All necessary power and data cables are ready for installation in the rack cabinet.
- Any necessary cooling lines are ready for attachment to the rear door heat exchanger. For information about the cooling lines, see the “*IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide*,” on the IBM Documentation CD.

Size and weight requirements

The RackCenter Type 7825 is an Electronic Industries Alliance (EIA) standard rack cabinet. See Table 1 and Table 2 for the dimensions and weights of the rack cabinet.

Note: The dimensions and weights shown are for the primary rack cabinet. Expansion rack cabinets, where applicable, have the same physical dimensions but weigh less because they do not have side panels.

Table 1. IBM iDataPlex Rack Type 7825 cabinet physical dimensions

Configuration	Dimensions
Rack cabinet with casters or front doors (no covers)	1200 mm x 840 mm x 2093 mm (47.25 in. x 33.07 in. x 82.4 in.)
Rack cabinet (no doors, covers, or casters)	1200 mm x 600 mm x 2093 mm (47.25 in. x 23.6 in. x 82.4 in.)
Rack cabinet and rear door	1200 mm x 844 mm x 2093 mm (47.25 in. x 33.23 in. x 82.4 in.)
Rack cabinet and side covers	1235 mm x 840 mm x 2093 mm (48.6 in. x 33.07 in. x 82.4 in.)
Rack cabinet, side covers, front and rear doors	1235 mm x 844 mm x 2093 mm (48.6 in. x 33.23 in. x 82.4 in.)
The optional IBM Rear Door Heat eXchanger for the iDataPlex Rack adds approximately 120 mm (5 in) to the depth of the rack when the casters are not installed.	

Table 2. IBM iDataPlex Rack Type 7825 cabinet weights

Configuration	Weight (approximate)
Empty	250 kg (551 lb)
Populated (rack, 42 2U chassis, 2 Ethernet switches, 4 PDUs)	1270 kg (2800 lb)

Minimum service clearances for iDataPlex racks

A rack cabinet requires a minimal service and operational clearance in the front and back to ensure proper ventilation and access to open the front and rear doors. An extended service clearance provides easier access to the rack cabinet so that you can install and service optional devices.

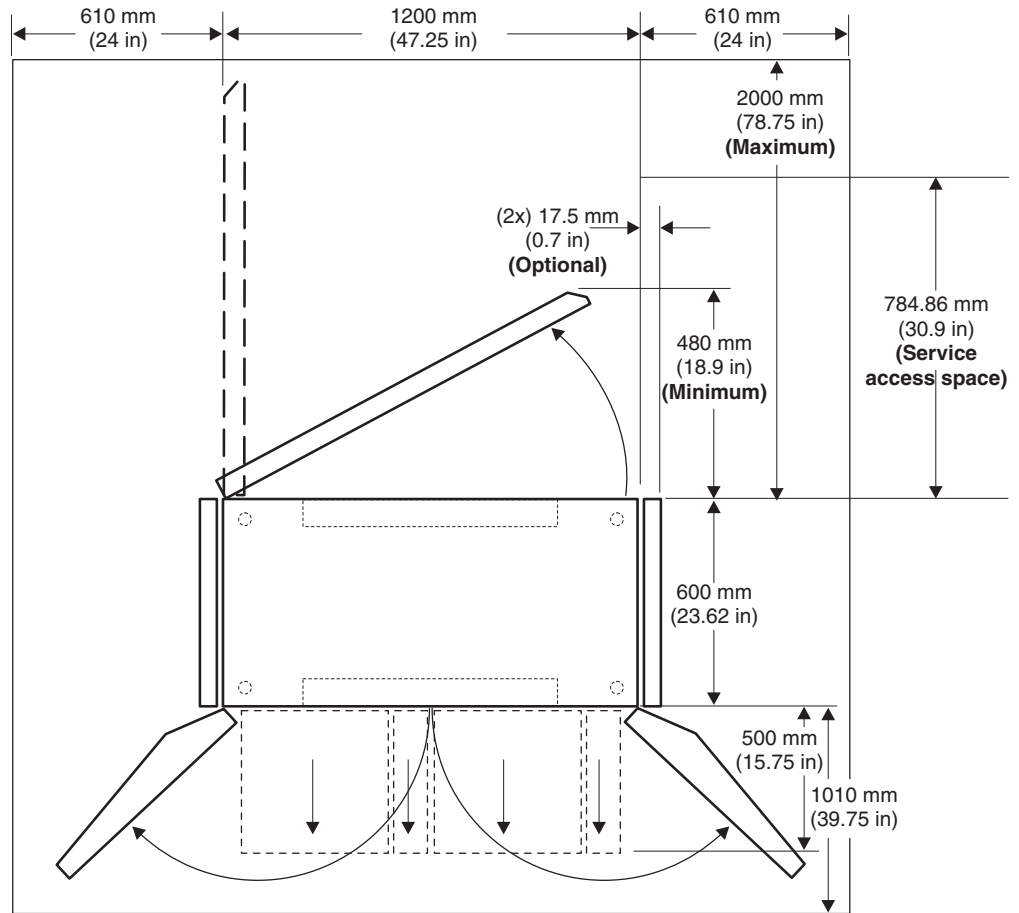
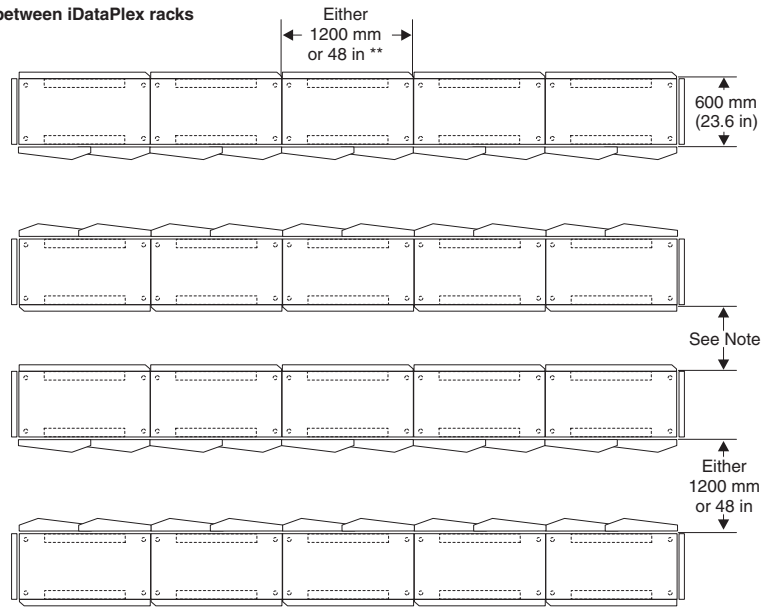


Figure 1. Providing service and operational clearance for the IBM iDataPlex Rack Type 7825

When you attach iDataPlex rack cabinets together to form a suite of rack cabinets, you must keep a minimum distance between suites in the same room. See Figure 2 on page 8 for information on the minimum distance between suites. Make sure that the fronts or rears of rack cabinet suites face each other. This provides proper ventilation and allows access to install and service optional devices.

Note: The access space that is needed to service the rack depends on the devices that are installed and your installation and service agreement. Unless your installation and service agreement specifies a smaller minimum access space, maintain a space of 784.86 mm (30.9 in.) behind the rack when a rear door heat exchanger is installed.

Space between iDataPlex racks

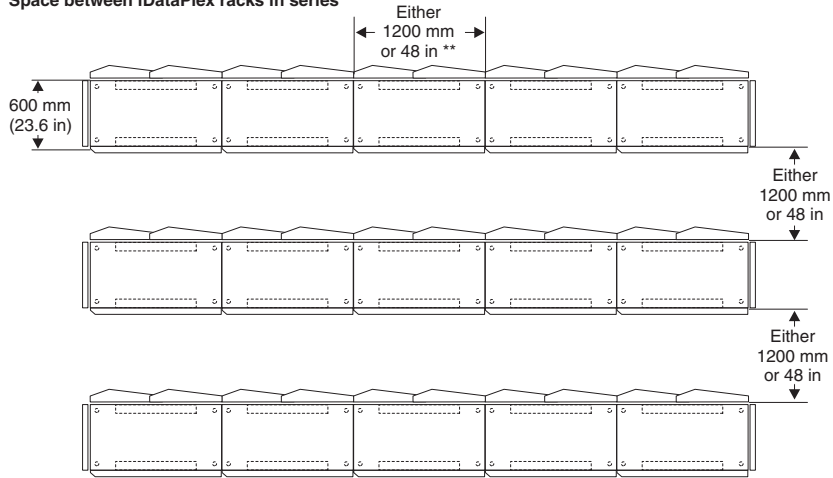


Note: Guidelines for space between racks:

- 600 mm or 24 in (no rear door heat exchangers installed)
- 1200 mm or 48 in (rear door heat exchangers installed)

** Depending on floor tile size. (European = 600 mm x 600 mm, English = 24 in. x 24in.)

Space between iDataPlex racks in series



When you attach iDataPlex rack cabinets together to form a suite of rack cabinets, you must keep a minimum distance between suites in the same room. This distance provides proper ventilation and allows access to install and service optional devices.

Notes:

1. The access space that is needed to service the rack depends on the devices that are installed and your installation and service agreement. Unless your installation and service agreement specifies a smaller access space, use the distance guidelines in Figure 2.
2. For this layout, rear door heat exchangers must be installed.

** Depending on floor tile size. (European = 600 mm x 600 mm, English = 24 in. x 24 in.).

Figure 2. Leaving space between rack cabinet suites

The internal dimensions of the rack cabinet conform to the EIA standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*. See Figure 3 on page 9 for rack cabinet internal dimensions.

The internal measurements in the following illustration are of one column in the rack cabinet.

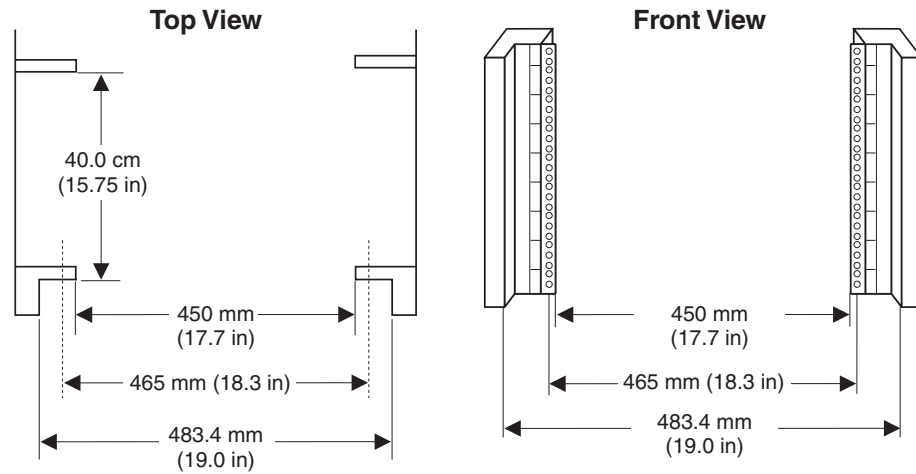


Figure 3. Measuring inside of the rack cabinet

All vertical rack cabinet measurements are given in rack units (U), where 1U is equal to 44.5 mm (1.75 in.) The U levels are marked on labels on the front and rear mounting flanges inside of the rack cabinet, as shown in Figure 4.

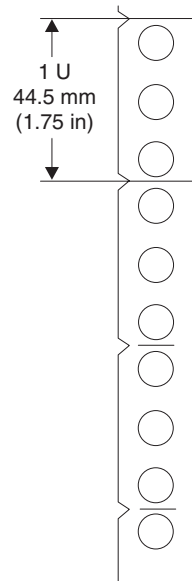


Figure 4. Measuring U levels within rack cabinets

Space requirements (creating a floor plan)

To be sure that you have enough space for the rack cabinet or suite of rack cabinets, create a floor plan before you install any rack cabinets. You might have to prepare and analyze several plans before you choose a final one. If you install more than one rack cabinet in more than one installation stage, prepare a separate plan for each installation stage. Consider the following factors when you prepare each plan:

- Flow of work and personnel within the area
- Operator access to units, as required
- If the placement will be on a raised floor:
 - Maximum cable lengths
 - Positioning over a cooling register
 - Routing and maximum length of cooling lines for the rear door heat exchanger, if necessary
- If the placement will not be on a raised floor:
 - Maximum cable lengths
 - Routing and maximum length of cooling lines for the rear door heat exchanger, if necessary
 - Need for cable guards, ramps, or other similar items to protect equipment and personnel
- Location of any planned safety equipment
- Future expansion

Begin with an accurate drawing of the installation area (blueprints and floor plans are appropriate). Be sure to include the following information in your floor plan:

- Service clearances that are required for each rack cabinet or suite of rack cabinets
- If the placement will be on a raised floor:
 - Things that might obstruct cable or cooling line routes
 - The height of the raised floor
- If the placement will not be on a raised floor:
 - The placement of cables and cooling lines to minimize obstruction.
 - The amount of cable that is required. (If the cable is routed indirectly between rack cabinets, such as along walls or suspended from the ceiling, additional cable might be required.)
 - The amount of hose for cooling lines that is required. (If the cooling lines are routed indirectly between rack cabinets, such as along walls or suspended from the ceiling, additional hose might be required.)
- Locations of equipment, furniture, and building features:
 - Power receptacles.
 - Air conditioning equipment and controls. (Air conditioning outlets should be located between fronts of facing suites of rack cabinets. Exhausts in the ceilings should be located between rears of rack suites.)
 - File cabinets, desks, and other office equipment.
 - Room emergency power-off controls.
 - All entrances, exits, windows, columns, and pillars.

Review the final floor plan to ensure that cable lengths are not too long and that the rack cabinets have enough clearance.

Power requirements

The rack cabinet does not require electricity, but the servers and optional devices that you install inside a rack cabinet do require connection to properly wired and grounded electrical outlets. You might need an electrician to assist you with planning for electrical requirements. For example:

- Each rack cabinet requires at least one uninterruptible power supply or power distribution unit (PDU) for servers and optional devices that you install in the rack cabinet.
- Each PDU or uninterruptible power supply requires a separate ac power branch circuit.
- The input voltage-selection switch on each device that you install in the rack cabinet must match the output voltage on the uninterruptible power supply or PDU.
- Power cords must match electrical outlets at the location where you install the rack cabinet.

Review the following safety information as you plan for your rack cabinet.

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Chapter 3. Cabling guidelines

Understanding the cluster configuration is important when you set up your cable strategy. The *IBM System Cluster 1350/iDataPlex Cabling Guidelines* document contains Cluster rack and content illustrations, a complete cable listing, power connection photos, and other information to use when planning your cluster installation.

To view the document, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5078247&brandind=5000008> and download the document, or complete the following steps:

1. Go to <http://www.ibm.com>
2. Under **Support & downloads**, go to the **Support by product** menu and click **Systems and servers**.
3. In the **Product support** box, click **System x**.
4. From the **Product family** menu, select **System x iDataPlex Solution** and click **Go**.
5. To view System iDataPlex Solution documentation, click **Documentation** in the **Support & downloads** box.
6. Click **Publications - iDataplex (xxxxxx)** and download the file `best_practices_for_cluster_cabling_xxxxxx.pdf` (where 'xxxxxx' is the date of the release).

Chapter 4. Installing the rack

The rack cabinet includes all the hardware for building a suite of rack cabinets, and you can order it with any combination of the following components:

- One side panel
- Two side panels
- No side panels
- Front door
- Rear door (rear door heat exchanger replaces the rear door)
- Optional rear door heat exchanger

Note: If the optional heat exchanger is shipped separately, see the *IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide* on the IBM Documentation CD for information.

The rack cabinet conforms to Electronic Industries Alliance (EIA) standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*.

Important: To help maintain proper cooling for all components installed in the rack, make sure that fillers are installed over all unoccupied bays.

Installation tools

Use the following tools to install or attach the IBM iDataPlex Rack Type 7825 cabinets, doors, or optional rear door heat exchanger:

- Leveler wrench (provided with rack)
- Phillip screwdriver (doors, brackets, and rear door heat exchanger)
- M3 hex driver (power cord retention bracket on rail)
- M7 hex driver (doors and brackets)
- M10 hex driver (doors, brackets, and rear door heat exchanger)
- Flat blade screwdriver (doors, brackets, and rear door heat exchanger)

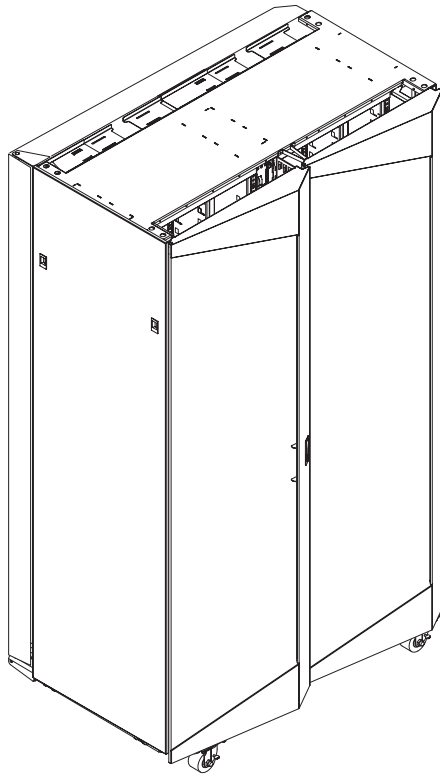


Figure 5. IBM iDataPlex Rack Type 7825

Unpacking the rack

To unpack the IBM iDataPlex Rack Type 7825 cabinet, complete the following steps:

1. Remove the banding and cardboard from the rack cabinet.
2. Remove the pallet ramp from the front of the palletized rack cabinet and set it aside.
3. Remove the rest of the cardboard and system bag from the rack cabinet.
4. Remove the shipping brackets that secure the rack cabinet to the pallet:

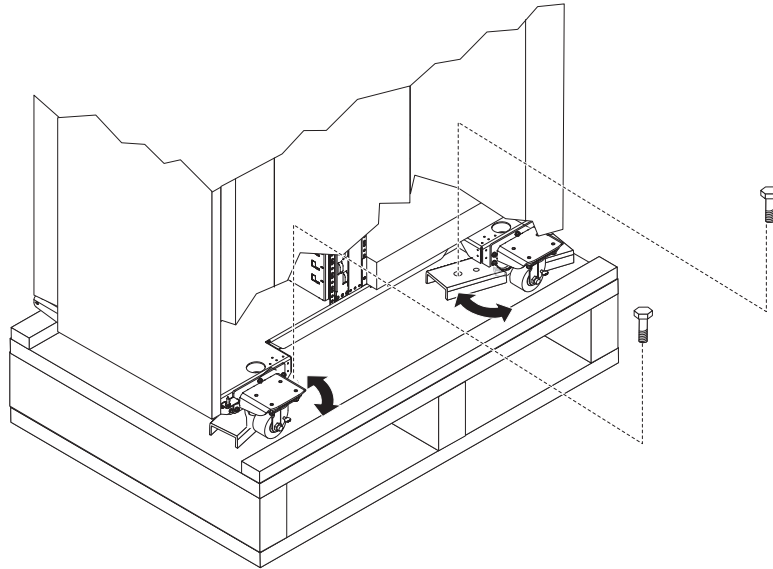


Figure 6. Removing the shipping brackets

- a. Loosen the two bolts that secure the shipping bracket; then, remove the inside bolt from the shipping bracket and set it aside.
- b. Rotate the shipping bracket out of the way; then, loosen the jam nuts on each leveler until the jam nut comes in contact with the top of the leveler foot.
- c. Raise the leveler all the way up.
- d. Repeat steps 4a and 4b for each of the brackets; then, continue to step 5.

5. Install the pallet ramp on either side of the pallet.

Attention: Do not attach the pallet ramp to the front or rear of the pallet. Pushing the rack cabinet off the front or rear of the pallet will cause the rack cabinet to tip over, causing a safety hazard.

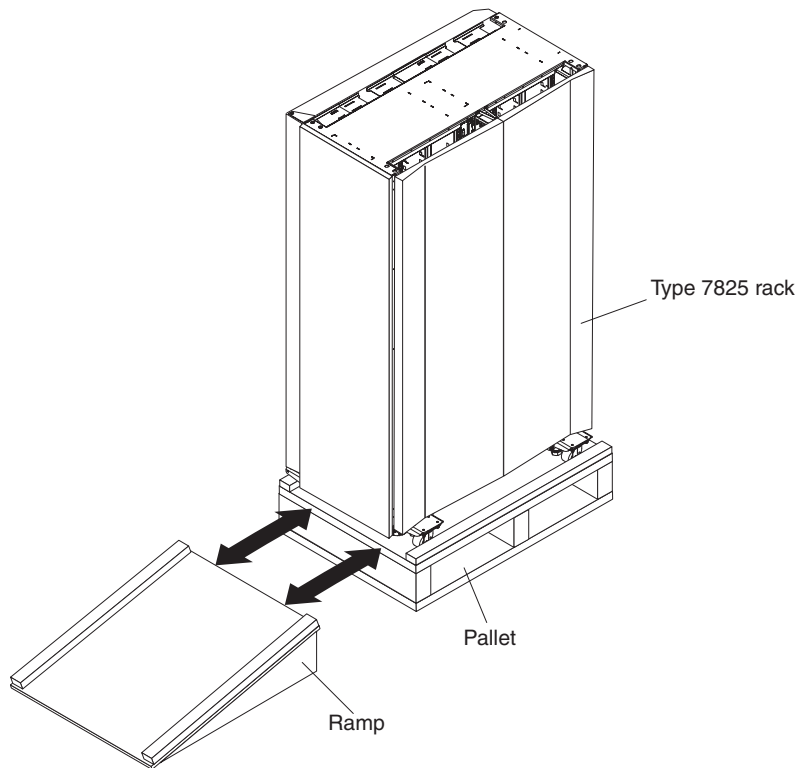


Figure 7. Install the ramp on the side of the pallet

- a. Position the pallet ramp with the angled end of the ramp away from the pallet.
 - b. Using the supplied wrench and the mounting bolts from the shipping brackets, secure the pallet ramp to the pallet.
6. Use the wrench that comes with the rack cabinet, raise each of the four leveling feet.

Statement 12:



CAUTION:

See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

7. Slowly push the rack cabinet off the pallet and down the ramp.

8. Remove the rear door shipping bracket located on the bottom left corner of the rear door. If the rack cabinet has a rear door heat exchanger installed, do not remove the bracket from the lower left corner at this time.

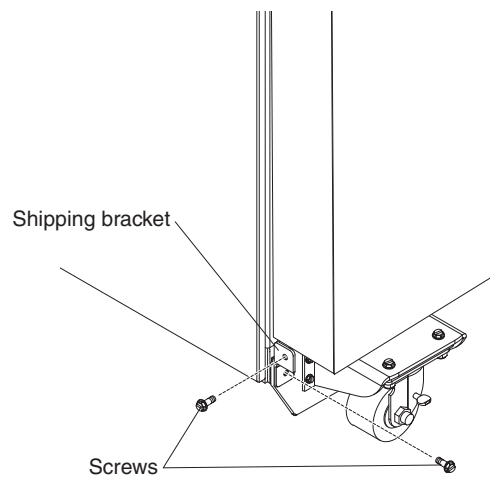


Figure 8. Installing the rear door shipping bracket

Moving the rack

The fully populated IBM iDataPlex Rack Type 7825 cabinet meets the UL/CSA/IEC 60950-1 stability test standards. Because these standards apply only to a rack cabinet in an installed location, IBM enforces additional standards to ensure stability when the rack cabinet is rolled on its casters. See Table 3 for empty and fully populated rack cabinet weights.

Note: The door opening must be at least 82.75 in. high and 33.5 in. wide for the IBM iDataPlex Rack Type 7825 cabinet to pass through the opening.

Table 3. IBM iDataPlex Rack Type 7825 cabinet weights

Configuration	Weight
Empty (no doors or covers)	250 kg (551 lb)
Populated	1360 kg (3000 lb)

When you move a rack cabinet, observe the following precautions.

Statement 8:



DANGER

- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Statement 12:



CAUTION:

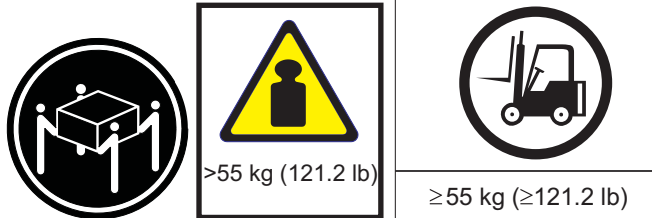
See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

Statement 13:



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



Installing the stabilizer feet

To install the stabilizer feet, complete the following steps.

Statement 2:



DANGER

- Always lower the leveling pads on the rack cabinet.
- Always install servers and optional devices starting from the bottom of the rack cabinet.
- Always install the heaviest devices in the bottom of the rack cabinet.

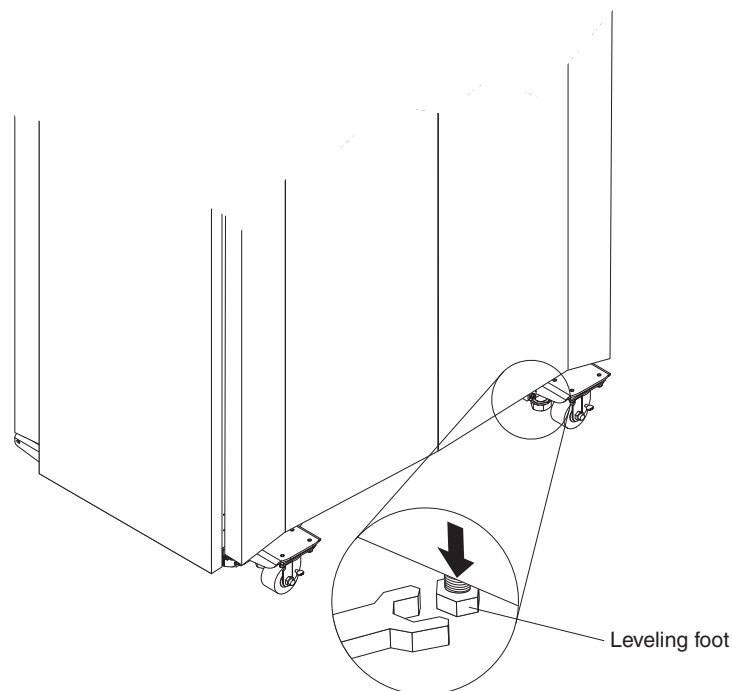


Figure 9. Lowering the leveling feet

1. Use the wrench that comes with the rack cabinet to lower each of the four leveling feet just enough so that they touch the floor.
2. Place a level on the cabinet and adjust the leveling feet until the cabinet is level front to back and side to side.
3. Tighten the jam nuts on each foot against the underside of the rack cabinet.

Installing the side panels

To install the side panels, complete the following steps.

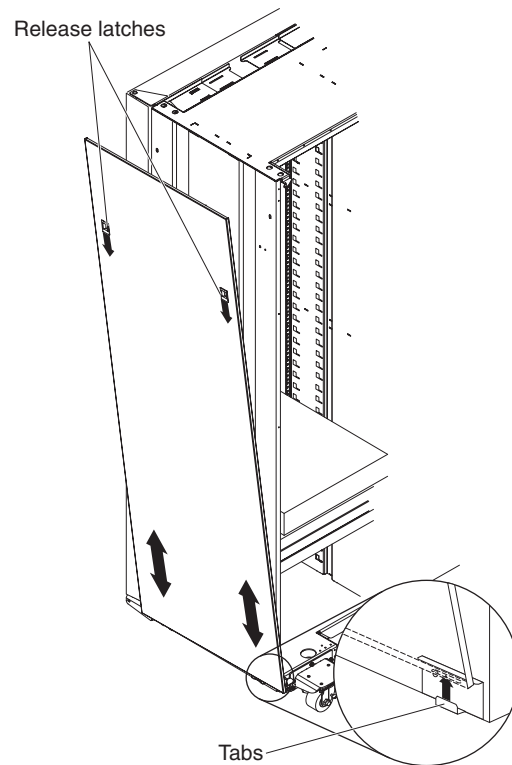


Figure 10. Installing the rack side panels

1. Tilt the side panel slightly toward you; then, lift the side panel and insert the tabs on the bottom of the rack cabinet into the slots in the side panel.
2. Push down on the release latches and rotate the top of the side panel toward the rack cabinet; then, release the latches.
3. Repeat steps 1 and 2 to install the other side panel.

Removing and installing rack doors

Remove the rack doors when you install and remove optional devices in the rack cabinet. All rack cabinets come with front and rear doors installed.

Note: You have to remove a door only if part of the rack cabinet is obstructed by the door as you install the optional device.

Removing the front doors

To remove the front doors, complete the following steps.

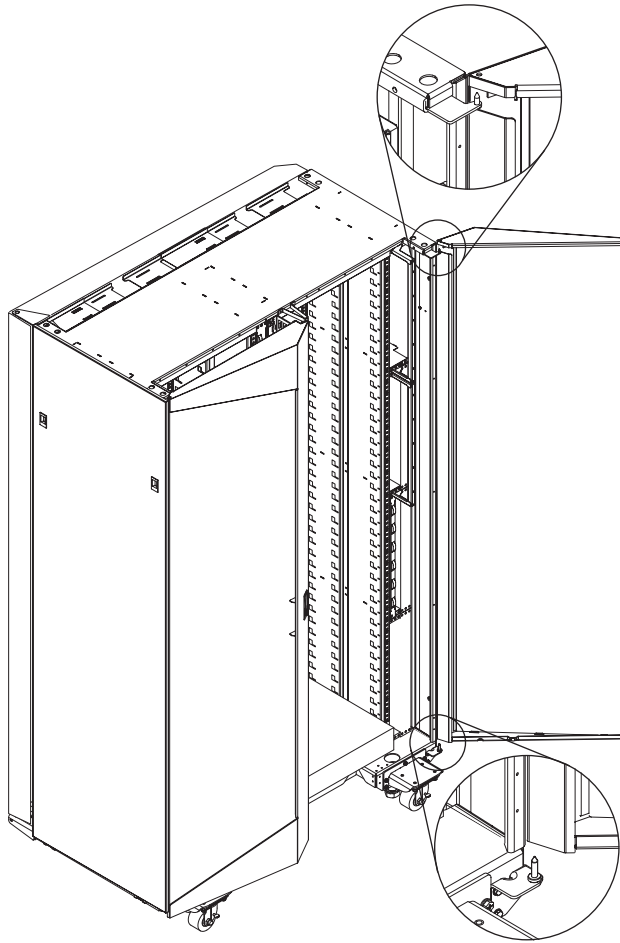


Figure 11. Removing a front door from the rack cabinet

1. Unlock and open the front doors fully. To remove a front door, it must be opened a minimum of 15° so that the slot in the door clears the hinge bracket.
2. While you support the door, lift the door off the hinge pins and pull the door away from the rack cabinet; then, set the door aside.
3. Repeat steps 1 and 2 to remove the other door.

Installing the front doors

To install the front doors, complete the following steps.

Attention: When you install a front door, be sure to align the hinge pins with the holes on the door before you set the hinge pins into place.

1. While you support the door, lift the door and align the hole in the bottom of the door with the bottom hinge pin first; then, lower the door slightly. Do not lower the door completely.
2. While continuing to support the door, align the hole in the top of the door with the top hinge pin and lower the door.
3. Repeat steps 1 and 2 to install the other door.
4. Close the doors completely and check their fit and the operation of the latch.

Removing the rear door

To remove the standard rear door, complete the following steps.

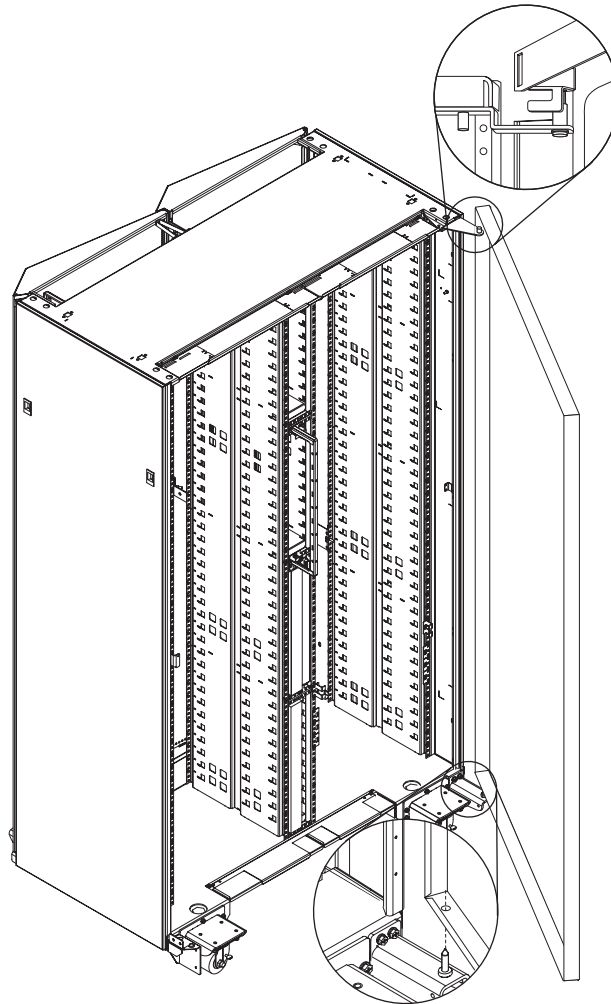


Figure 12. Removing a rear door from the rack cabinet

Note: For instructions to remove or install the rear door heat exchanger, see the *IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide* on the IBM Documentation CD.

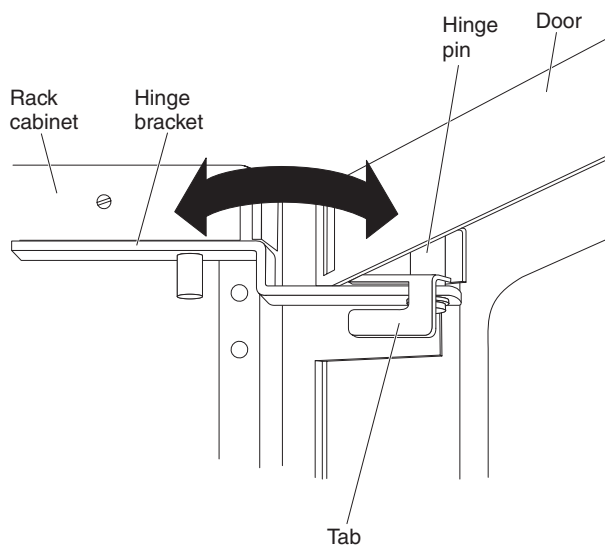


Figure 13. Open the door so that the tab clears the hinge bracket

1. Unlock and open the rear door. To remove the rear door, it must be opened a minimum of 15° so that the tab on the rear door clears the hinge bracket.
2. While you support the door, lift the door off the hinge pins and pull the door away from the rack cabinet; then, set the door aside.

To remove the rear door hinge brackets, complete the following steps.

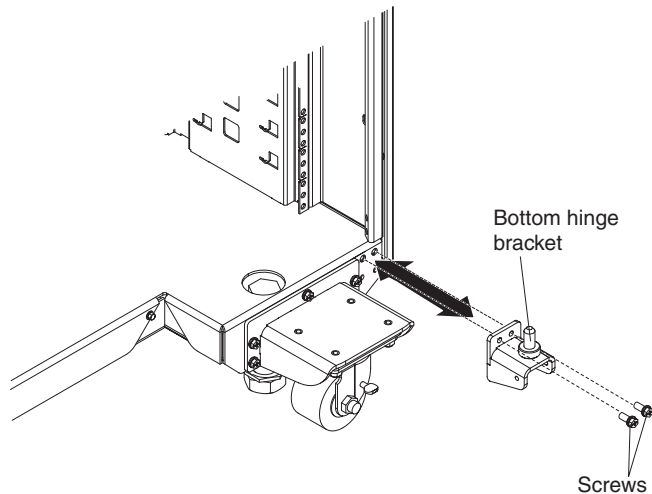


Figure 14. Remove the bottom hinge bracket

1. Remove the bottom hinge bracket on the right side of the rack cabinet.

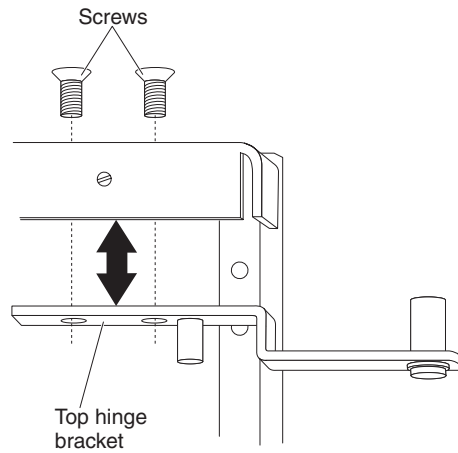


Figure 15. Install the top hinge bracket

2. Position a ladder near the right side of the rack cabinet. Climb the ladder to remove the screws and top hinge bracket.

Installing the rear door

To install the standard rear door, complete the following steps.

Note: For instructions to remove or install the rear door heat exchanger, see the *IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide* on the IBM Documentation CD.

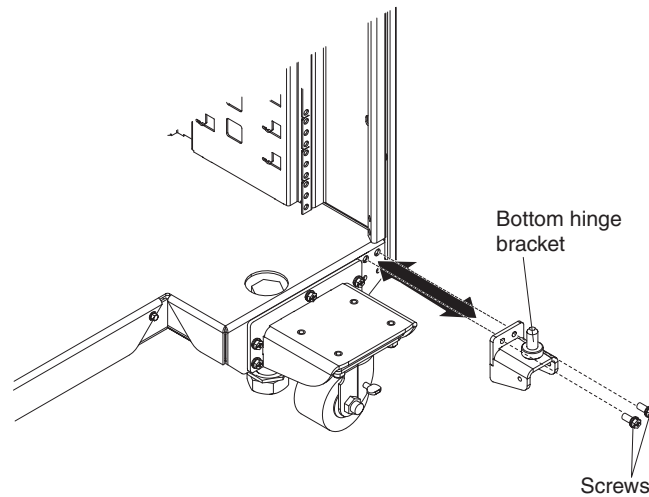


Figure 16. Install the bottom hinge bracket

1. Align the holes in the hinge bracket with the mounting holes on the right side of the rack cabinet; then, install the screws.

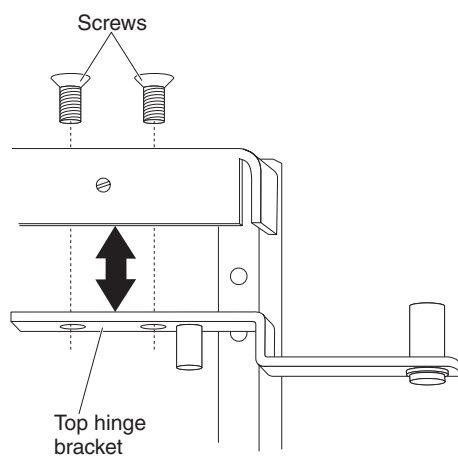


Figure 17. Install the top hinge bracket

2. Position a ladder near the right side of the rack cabinet. Climb the ladder to install the top hinge bracket and screws.

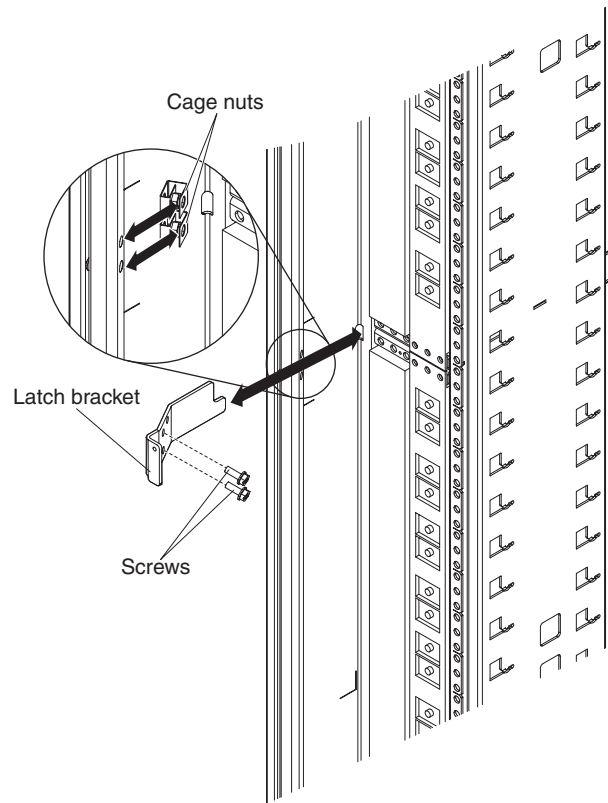


Figure 18. Install the latch bracket

3. If necessary, install the latch bracket on the left side of the rack cabinet.
 - a. Install the two cage nuts on the right-side rail of the rack cabinet.
 - b. Align the holes in the latch bracket with the holes in the rail and nut clips; then, secure the latch bracket in place with two M6 screws.
4. Position the rear door near the right side of the rack cabinet.
5. While you support the door, lift the door and align the holes in the top and bottom of the door with the hinge pins.
6. Lower the door onto the hinge pins.
7. Before you continue, make sure that the latch is open on the door.
8. Check the fit of the door. Close it to make sure that it swings freely and the door latches correctly.

Installing an optional rear door heat exchanger

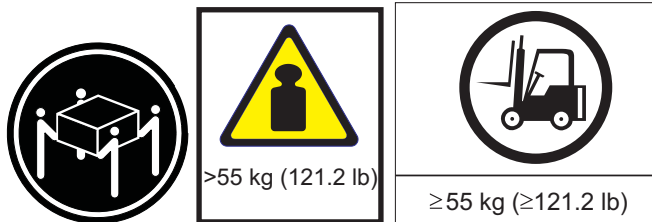
Before you can install the optional rear door heat exchanger, you must remove the standard rear door and the hinge brackets. See “Removing the rear door” on page 25 for information. Then, see the *IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide* on the IBM Documentation CD for information.

Statement 13:



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



Attention:

1. Because of the size and weight of the heat exchanger, a lift tool and a minimum of two or more trained service technicians or a lift tool and professional movers are required to remove or install the heat exchanger.
2. You must remove the power from the rack cabinet and all components before you connect or disconnect the water supply lines and drain or fill the heat exchanger.

Connecting power to the rack

Connect power to the rack cabinet by using pigtails with a standard plug. You can connect 120 V, 220 V, or three-phase (208 V, 220 V, or 240 V) to the power distribution units.

The power distribution unit (PDU) installs vertically in the vertical bays of the rack cabinet. When you choose an installation location, make sure that power cables from other devices can reach the PDU. See the documentation that comes with the PDU for detailed installation instructions.

Statement 8:



DANGER

- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Use the following general procedure to install a PDU in a vertical bay of a rack cabinet.

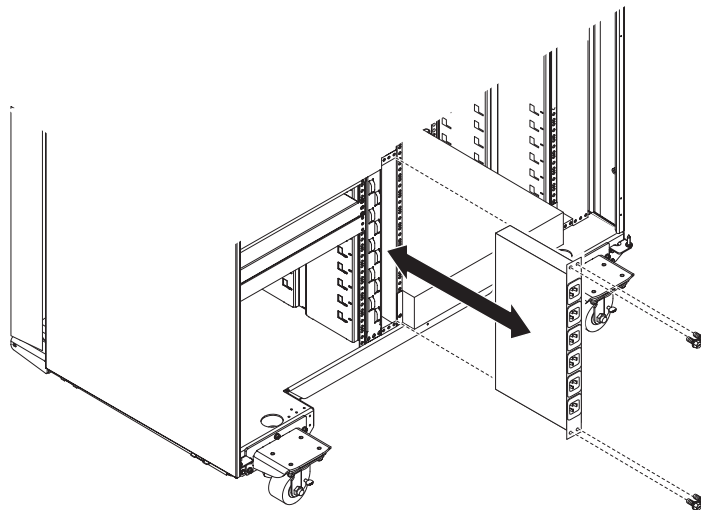


Figure 19. Installing a PDU vertically in a rack cabinet

1. See the PDU documentation for detailed installation information.

Note: If the PDU has a circuit breaker switch, make sure that the switch is in the Off position before you install the PDU in the rack cabinet.

2. Install the PDU inside one of the vertical mounting areas of the rack cabinet with the M6 screws and nuts that come with the PDU.
3. See the PDU documentation for information about how to connect cables.

Turning on the power to the cabinets

To turn on the power to the cabinets, complete the following steps:

1. Turn on any switches. This is necessary so that cluster components can communicate when they are brought online.
2. Turn on any storage expansion enclosures.

Note: These must be brought online before the controllers to prevent an error condition.

3. Turn on any storage controllers.
4. Turn on the storage server or servers. Management and compute servers depend on the mount points on the storage servers.
5. Turn on the management server or servers.

Note: By turning on the management servers before you turn on the compute servers, you can turn on the compute servers faster.

6. Turn on the compute servers.

Repeat the procedure for every cabinet unit in the cluster before powering on the primary cabinet.

Attaching rack cabinets in a suite

The rack cabinets come with all the hardware that is required for you to attach rack cabinets together and form a suite. To attach the rack cabinets together in a suite, complete the following steps.

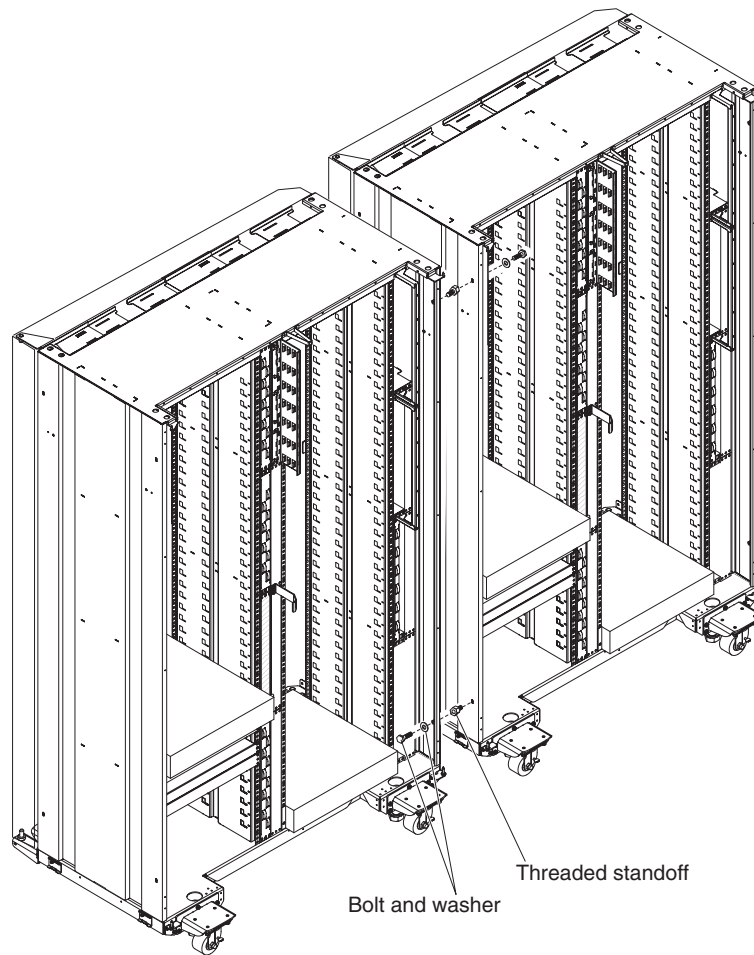


Figure 20. Attaching two adjacent rack cabinets to each other to form a suite

1. If necessary, remove the front and rear doors (see “Removing the front doors” on page 24 and “Removing the rear door” on page 25) from both rack cabinets.
2. On the facing sides of the two adjacent rack cabinets, install the four threaded standoffs:
 - a. Install two threaded standoffs on the rack cabinet to the left, one on the top front and one on the bottom rear.
 - b. Install the other two threaded standoffs on the rack cabinet to the right, one on the bottom front and one on the top rear.
3. Attach the rack cabinets together, using four bolts and washers.

Note: You must install the top front and bottom rear bolts from right to left; then, install the bottom front and top rear bolts from left to right.

4. Repeat steps 1 through 3 until you have attached all the rack cabinets in the suite; then, continue to the next step.
5. If necessary, install the side panels on each end of the suite. See “Installing the side panels” on page 23 for information.
6. If necessary, install the front and rear doors on all the rack cabinets. If you plan to install the optional rear door heat exchangers on the cabinets, see “Installing an optional rear door heat exchanger” on page 30 for information.

Removing and installing the casters

The casters can be removed or left in place once the rack cabinet is installed. All rack cabinets come with four casters installed.

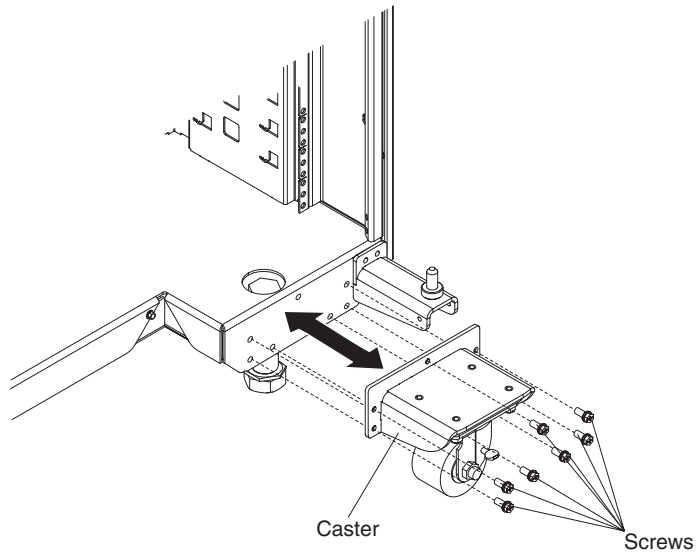


Figure 21. Install and remove the casters

Removing the casters

To remove the casters, complete the following steps.

1. Unlock and open the rack cabinet doors fully.
2. Remove the caster.

Installing the casters

To install the casters, complete the following steps.

1. Unlock and open the rack cabinet doors fully.
2. Position the caster so that the wheel is facing the floor; then, align the mounting holes with the holes in the rack cabinet.
3. Use seven M6 screws to secure the caster to the cabinet.
4. Repeat steps 2 through 3 for each of the remaining casters.
5. Close and lock the rack cabinet doors.

Chapter 5. Power cord and rails

This chapter contains information about the installation and removal of power cords and rails in the iDataPlex Rack Type 7825 cabinet.

Notes:

1. Remove the rack doors when you install and remove optional devices in the rack cabinet. All rack cabinets come with front and rear doors installed.
2. You have to remove a door only if part of the rack cabinet is obstructed by the door as you install the optional device.

Removing and installing a power cord

To remove a power cord, complete the following steps.

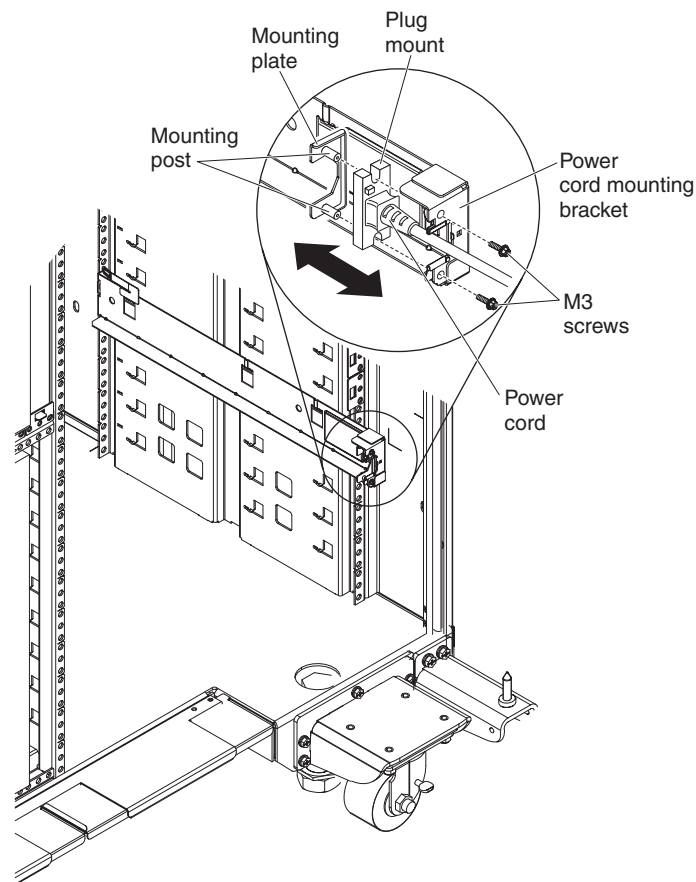


Figure 22. Removing and installing the power cord

1. Turn off the power to the system-board trays; then, remove the chassis from the rack. See the *Problem Determination and Service Guide* on the IBM Documentation CD for instructions.
2. Unplug the power cord that you are working on from the PDU.
3. Remove the two M3 screws from the back of the rail and set them aside.
4. Pull the mounting plate and power cord toward the front of the rack cabinet.
5. Separate the power cord from the mounting plate; then, set the mounting plate aside and dispose of the power cord.

To install a power cord, complete the following steps.

1. Align the mounting posts on the mounting plate with the slots in the plug mount and install the power cord onto the mounting plate.
2. Position the entire assembly inside the left rail and align the mounting posts with the holes in the back of the power cord mounting bracket on the rail.
3. Use two M3 screws to secure the power cord and mounting plate to the mounting bracket.
4. Plug the power cord that you are working on into a PDU.
5. Install the chassis into the rack and turn on the power to the system-board trays. See the *Problem Determination and Service Guide* on the IBM Documentation CD for instructions.

Removing and installing rails

This section provides the information needed to install and remove the 2U/3U chassis rails and optional device rails.

Removing and installing 2U/3U chassis rails

The 2U/3U chassis rails are used to secure 2U or 3U iDataPlex chassis enclosures in an iDataPlex rack cabinet. If you are removing or installing the optional device rails, see “Removing and installing optional device rails” on page 39 for instructions.

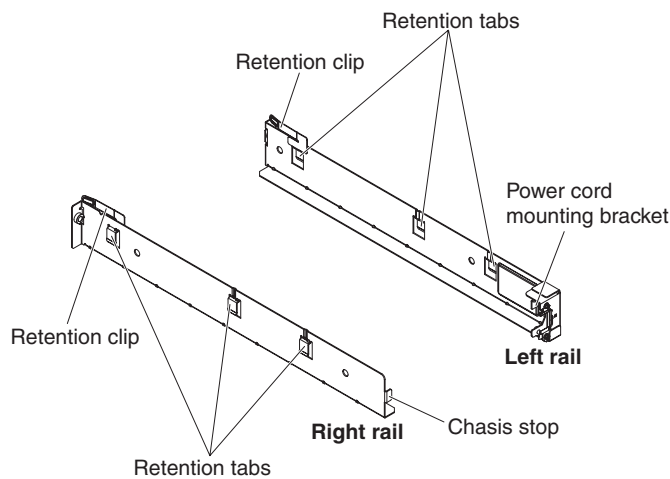


Figure 23. 2U/3U chassis rails

Removing the 2U/3U chassis rails

To remove the standard rails from the rack cabinet, complete the following steps.

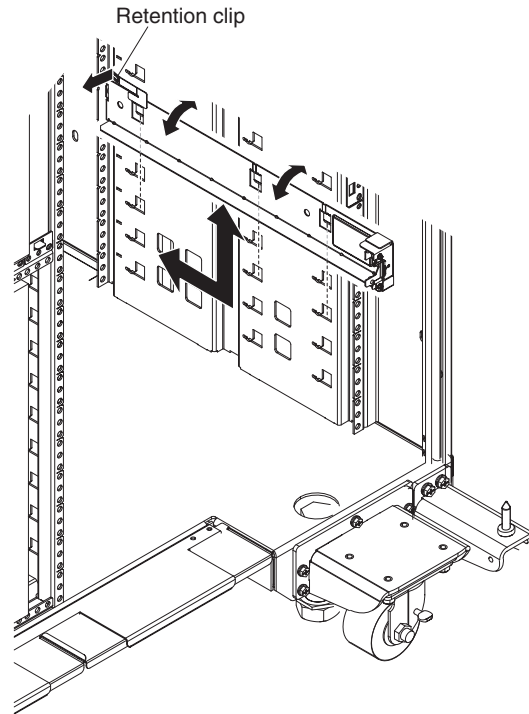


Figure 24. Removing the power cord

1. Turn off the power to the system-board trays; then, remove the chassis from the rack. See the *Problem Determination and Service Guide* on the IBM Documentation CD for instructions.
2. Unplug the power cord connected to the rail that you are removing from the PDU.
3. Remove the power cord from the rail. See "Removing and installing a power cord" on page 35 for instructions.
4. Remove a rail from the rack.
 - a. Pull out on the retention clip on the front of the rail.
 - b. While holding the retention clip out, pull the rail toward the rear of the rack cabinet until it stops.
 - c. Rotate the top edge of the rail away from the rack cabinet wall and lift the rail up and out of the rack cabinet.
 - d. Repeat steps 4a through 4c for the remaining rail.

Installing the 2U/3U chassis rails

To install the 2U/3U chassis rails in the rack cabinet, complete the following steps.

1. Install a rail in the rack cabinet.

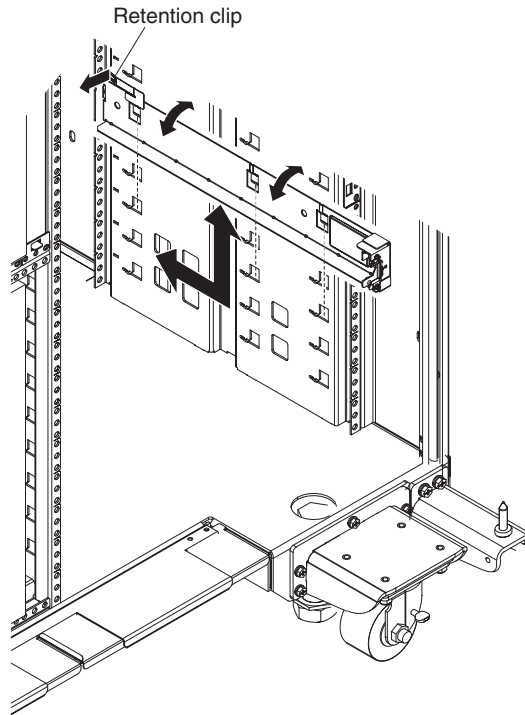


Figure 25. Installing the 2U/3U chassis rail

- a. Align the three retention tabs on the rail with the mounting slots in wall of the rack cabinet.
- b. Place the retention tabs into the mounting slots and rotate the top edge of the rail toward the rack cabinet wall.
- c. Push the rail down until it stops.
- d. Push the rail toward the front of the rack cabinet. When the rail is in position, the retention clip will click into place.
- e. Repeat steps 1a through 1d for the remaining rail. If you are installing or replacing the left rail, continue to step 2; otherwise, skip to step 3.
2. If necessary, install the power cord in the left rail. See "Removing and installing a power cord" on page 35 instructions.
3. Plug the power cord into a PDU.
4. Install the chassis in the rack; then, turn on the system-board trays. See the *Problem Determination and Service Guide* on the IBM Documentation CD for instructions.

Removing and installing optional device rails

The optional-device rails are used to secure optional devices in the iDataPlex rack cabinet. If you are installing or remove 2U/3U chassis rails, see “Removing and installing 2U/3U chassis rails” on page 36 for instructions.

Removing the optional device rails

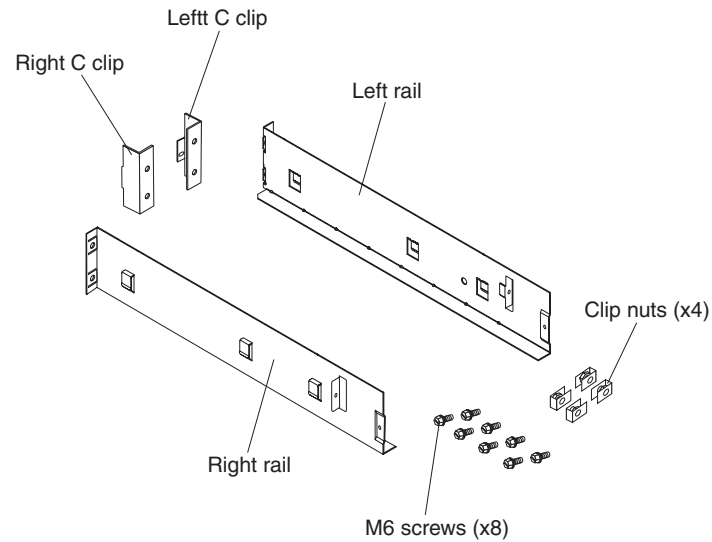


Figure 26. Optional-device rails

To remove an optional-device rail from the rack cabinet, complete the following steps.

1. Turn off the device; then, remove it from the rack. See the documentation that came with the device for instructions.
2. Unplug the power cord from the PDU.
3. Remove a rail from the rack.

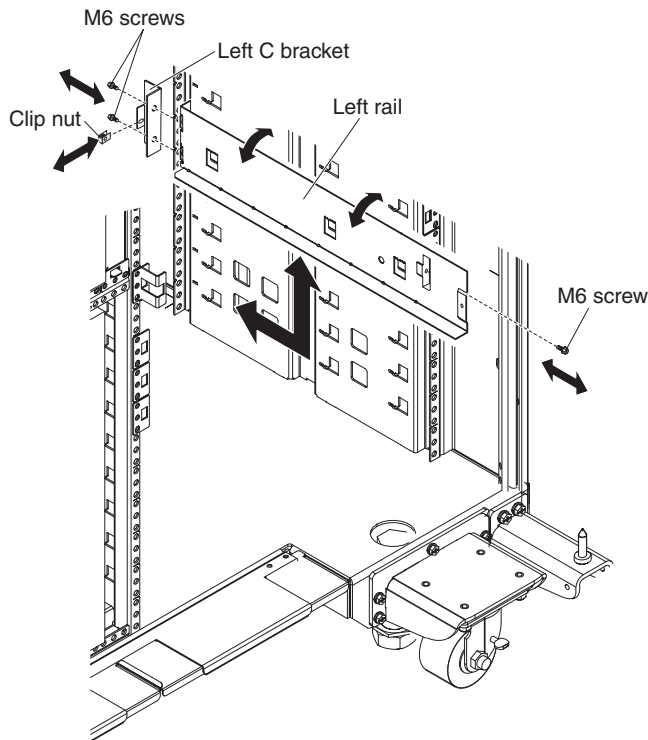


Figure 27. Removing the optional device rails

- a. Remove the two M6 screws from the front of the rail and one M6 screw from the rear. The front M6 screws also secure the C-bracket. You must hold the C-bracket in place while removing the screws.
- b. Pull the rail toward the rear of the rack cabinet until it stops.
- c. Rotate the top edge of the rail away from the rack cabinet wall and lift the rail up and out of the rack cabinet.
- d. Repeat steps 3a through 3c for the remaining rail.

Installing the optional device rails

To install an optional-device rail on the rack cabinet, complete the following steps:

1. Install an optional-device rail in the rack cabinet.

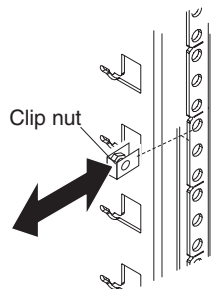


Figure 28. Installing the rear clip nut

- a. If necessary, install a clip nut on the vertical rail of the rack cabinet in the first hole of the second U. When the rail is installed, the hole in the rail's rear flange should align with this clip nut.

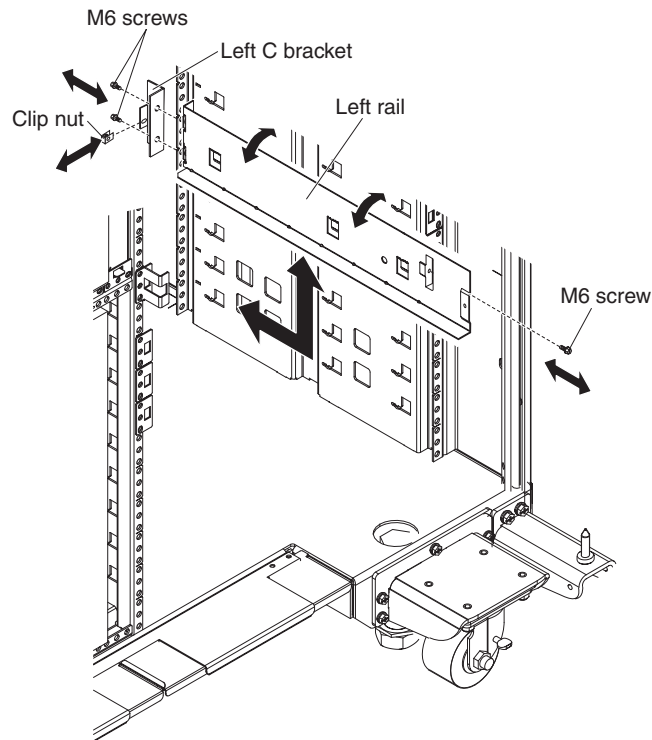


Figure 29. Installing the optional device rails

- b. Align the three retention tabs on the rail with the mounting slots in the wall of the rack cabinet.
 - c. Place the retention tabs into the mounting slots and rotate the top edge of the rail toward the rack cabinet wall.
 - d. Push the rail down until it stops.
 - e. Push the rail toward the front of the rack cabinet. When the rail is in position, the rails front flange will be flush against the back of the rack cabinet vertical rail.
 - f. Install the C-bracket on the front of the rack cabinet:
 - 1) Align the holes in the C-bracket with the threaded holes of the rail.
 - 2) Using two M6 screws, secure the C-bracket to the rail and rack cabinet.
 - 3) Install a clip nut on the front of the C-bracket.
 - g. Repeat steps 1a through 1f for the remaining rail.
2. Install the device in the rack and plug the power cord into a PDU; then, turn on the device. See the documentation that came with the device for instructions.

Chapter 6. Accessing the cluster from a remote location

This chapter includes information about:

- Accessing the cluster from a remote location
- Accessing each server before the operating system is installed

Using the remote power command

The command **rpower** starts and resets hardware, powers hardware on and off, and queries the server power state. The syntax is:

```
rpower <serverrange> [-serverps] [on | off | reset | stat | state | boot | cycle]
[-V|-verbose]
```

```
rpower[-hl-help|-v|-version]
```

PPC (with IVM or HMC) specific:

```
rpower <serverrange> [-serverps] [of] [-V|-verbose]
```

Remote console

All iDataPlex solution clusters can support a textual out-of-band console during BIOS and OS installation and operation. This is achieved either through SOL or using serial terminal servers. The **wcons** command accesses the remote console. This command opens a remote console session for any cluster servers. The syntax is:

```
wcons <serverrange>
```

Displaying server configuration information

The Extreme Cluster Administration Toolkit (xCAT) maintains a database of configuration information about the servers that are configured in the iDataPlex solution cluster. To download xCAT, go to <http://xcat.sourceforge.net/>. To display the server configuration, type the following command at the console prompt:

```
lsdef <serverrange>
```

The output provides information about each server, such as the server type, model number, serial number, and host name. The output might also provide mapping data between servers and switches, BladeCenter chassis, and terminal servers.

Related topics

- Chapter 3, “Cabling guidelines,” on page 13
- Appendix A, “Error and event logs,” on page 45

Appendix A. Error and event logs

There are multiple log files available to help monitor and troubleshoot the cluster:

Linux log

The Linux OS log can be viewed in `/var/log/messages`

The system logging daemons are `syslogd` and `klogd`. They are configured via `/etc/syslog.conf`.

Log files are automatically rotated by the `logrotate` command. To rotation is configured with the `/etc/logrotate.conf` file.

server log

POST/BIOS errors can be read by pressing F1 during the boot process and selecting **View Error Logs** from the menu. This action results in a POST code and a description of the error. For example:

301 Keyboard Input Error 164 Memory size has changed

Systems management log

Each server in an iDataPlex solution cluster will have an associated system event log. This might be read using the xCAT `eventlog <serverrange> all` command.

Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

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

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

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

Using the documentation

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

Getting help and information from the World Wide Web

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

index.html. The address for IBM BladeCenter information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation® information is <http://www.ibm.com/intellistation/>.

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

Software service and support

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

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

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

Note: If you have both 1410 and 7825 machine types in your rack cluster, use the 1410 when placing the service call.

For the iDataPlex solution call process, complete the following steps:

1. After a hardware failure is identified, call 1-800-IBM-SERV (1-800-426-7378).
2. Make sure that you use the Cluster machine type 1410 when placing the call. The name iDataPlex is the name of the solution, not the name of the machine type.
3. Make sure that you have your customer number associated with the Support Line contract which is unique to this contract. After the customer number is verified, customer support works with you to determine and solve the problem.

IBM Taiwan product service

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

IBM Taiwan product service contact information:

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

Appendix C. CRU and FRU information and part numbers

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You might install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For an updated parts listing on the Web, complete the following steps:

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product Support** section, click **System x**.
3. From the **Product family** menu, select **System x iDataPlex Solution**.
4. Select the applicable type and model.
5. In the **Support & downloads** box, click **Plan & upgrades**.
6. From the list of results, select the applicable parts list document.

The following replaceable components are available for the IBM iDataPlex Rack Type 7825.

Table 4. CRU/FRUs, IBM iDataPlex Rack Type 7825

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
Cable management 1U belt		46C6298	
Cable management handle bracket	46C6306		
Cable management IB plate assembly		46C6299	
Cisco 2960 rear hardware kit		46C6312	
Cisco 4948 rear hardware kit		46C6313	
Cisco 3750 rear hardware kit		46C6314	
Cyclades ACS-48 hardware kit		46C6315	
C/C rail kit		46C6316	
Duct assembly, short pocket		46C6291	
Front cover hardware parts kit		46C6307	
Left front cover assembly		46C6296	
Low rear door hinge assembly	46C6294		
Line Cord, 30A/208V	39M5493		
Line Cord, 32A/240V	39M5495		
Line Cord, 32A/250V	39M5497		
Line Cord, 30A/250V	39M5499		
Rack Caster Asm			46C6290
Rack to rack hardware kit		46C6311	
Rack label kit	46C6308		
Rackmanager hardware mounting kit		46C6317	
Rail kit		44W4793	
Rear door shipping bracket	46C6337		
Right front door assembly		46C6297	
Side cover assembly		46C6292	
S2S Right duct assembly		46C6295	
S2S Left duct assembly		46C6309	
S2S Rear duct assembly		46C6310	

Appendix D. Notices

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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

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