

5094, 5096, 5294 & 5296
Expansion Units Removal and
Replacement Procedures



ESCALA

5094, 5096, 5294 & 5296 Expansion Units Removal and Replacement Procedures

Hardware

May 2009

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357 AVENUE PATTON
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FRANCE

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Safety notices

Safety notices may be printed throughout this guide:

- **DANGER** notices call attention to a situation that is potentially lethal or extremely hazardous to people.
- **CAUTION** notices call attention to a situation that is potentially hazardous to people because of some existing condition.
- **Attention** notices call attention to the possibility of damage to a program, device, system, or data.

World Trade safety information

Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, a safety information booklet is included in the publications package shipped with the product. The booklet contains the safety information in your national language with references to the U.S. English source. Before using a U.S. English publication to install, operate, or service this product, you must first become familiar with the related safety information in the booklet. You should also refer to the booklet any time you do not clearly understand any safety information in the U.S. English publications.

German safety information

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Laser safety information

IBM[®] servers can use I/O cards or features that are fiber-optic based and that utilize lasers or LEDs.

Laser compliance

All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

CAUTION:

This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION:

This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

CAUTION:

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information: laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to the IBM servers that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE:

The equipment is suitable for installation in the following:

- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metallically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Note: All Ethernet cables must be shielded and grounded at both ends.

The ac-powered system does not require the use of an external surge protection device (SPD).

The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal *shall not* be connected to the chassis or frame ground.

5094, 5294, 5096, and 5296 removal and replacement procedures

Use these procedures to remove and replace failing parts.

Before you begin a replacement, perform these tasks:

1. If you are performing a replacement procedure that might put your data at risk, ensure, if possible, that you have a current backup of your system or logical partition (including operating systems, licensed programs, and data). For information on backing up your system or logical partition, go to the following: http://publib.boulder.ibm.com/infocenter/series/v1r3s/en_US/index.htm
2. Review the installation or replacement procedure for the feature or part.
3. Note the significance of color on your system. **Blue** or **terra-cotta** on a part of the hardware indicates a touch point where you can grip the hardware to remove it from or install it in the system, open or close a latch, and so on. **terra-cotta** might also indicate that the part can be removed and replaced with the system or logical partition power on.
4. Ensure that you have access to a medium, flat-blade screwdriver.
5. If parts are incorrect, missing, or visibly damaged, contact your service provider or next level of support.

DANGER: When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- 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 procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention:

Failure to follow the step-by-step sequence for FRU removal and/or installation may result in FRU or system damage.

Use the following precautions whenever you handle electronic components or cables.

- The electrostatic discharge (ESD) kit and the ESD wrist strap must be used when handling logic cards, SCMs, MCMs, electronic boards, and disk drives.
- Keep all electronic components in the shipping container or envelope until you are ready to install them.
- If you remove, then reinstall an electronic component, temporarily place the component on an ESD pad or blanket.

AC charger or module

1.

You must determine if the repair can continue concurrently. To continue the repair concurrently, the following condition must be true:

- An AC Module must already be installed in location A02 of the unit containing the FRU that is being repaired.

If this condition is not true, the repair can continue only after powering off the unit containing the FRU that is being repaired. If the unit is already powered off, you may proceed with a non-concurrent repair.

2.

Select an Action:

Concurrent repair.

Continue the repair with
unit power on.

Non-concurrent repair.

Power off the unit and
continue the repair

Delay the repair.

This ends the procedure.

3.

Use this procedure to service the AC Charger (A01) or AC Module (A01 and A02).

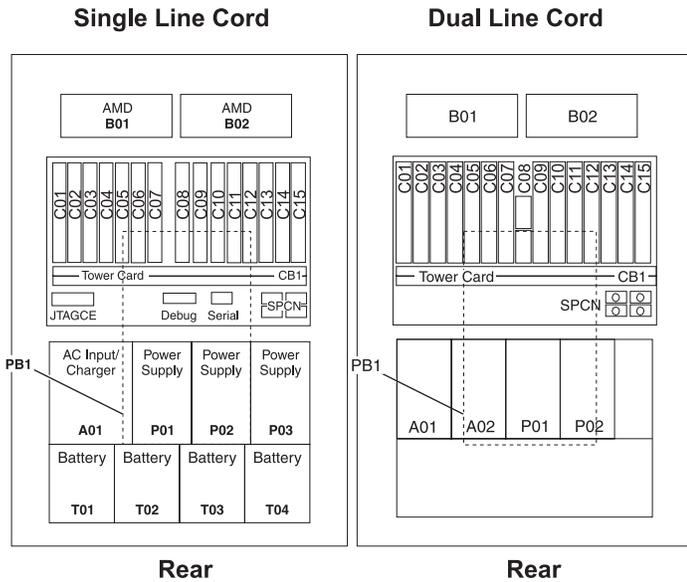
The AC Charger/AC Module is in location:

Machine Type:

Model:

Serial Number:

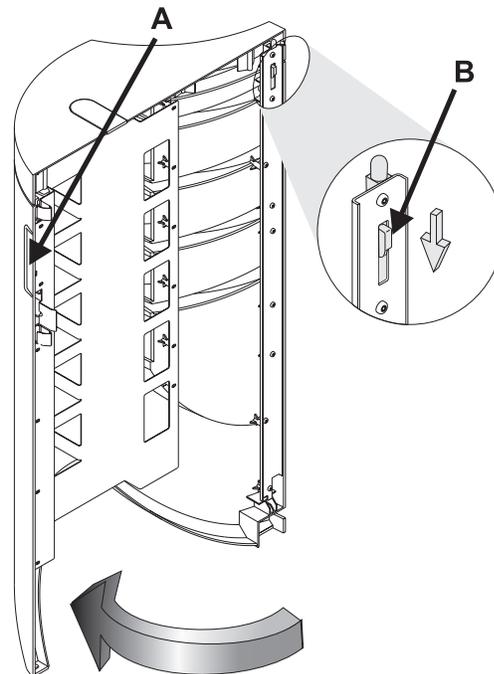
The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



4.

Remove the rear cover

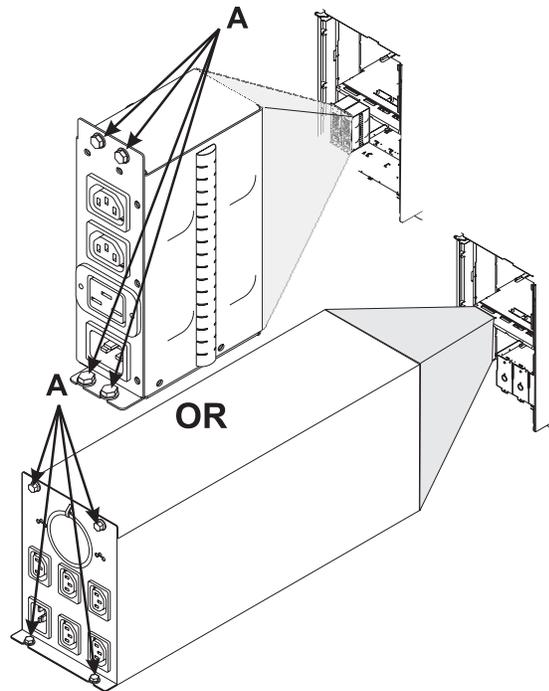
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



5.

Remove the AC Charger/AC Module

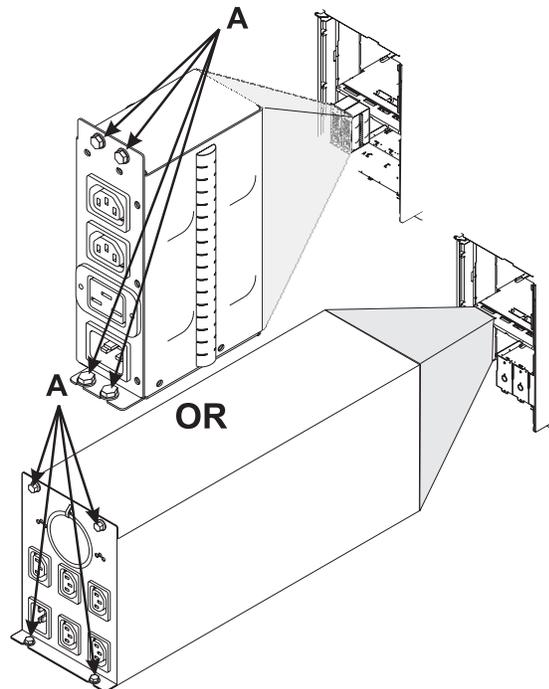
1. Disconnect the AC input line cord from the AC charger/module that needs replacing.
2. Disconnect the power supply jumper cords from the AC charger/module that you are working on.
3. Remove the four screws (A) that hold the AC charger/module to the frame.
4. Remove the AC charger/module from the frame by pulling on the ring (B) (if present) with one hand, then supporting the bottom of the AC charger/module with your other hand.



6.

Install the AC Charger/AC Module

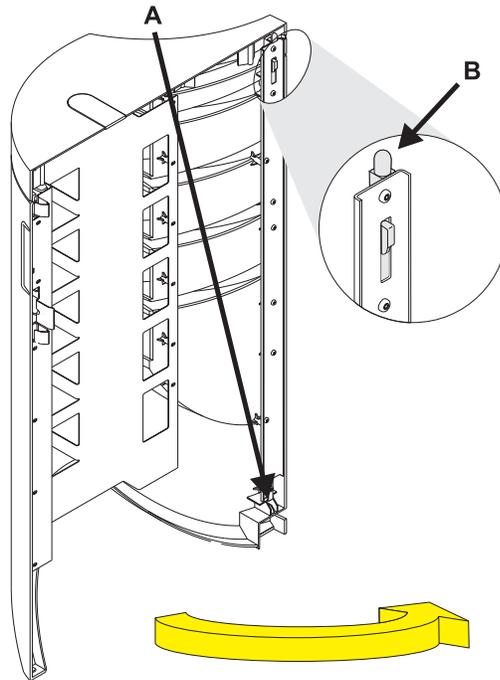
1. Install the AC charger/module in the frame.
2. Install the four screws (A) that hold the AC charger/module to the frame.
3. Connect the power supply jumper cords to the AC charger/module.
4. Connect the ac line cord to the AC charger/module.



7.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.

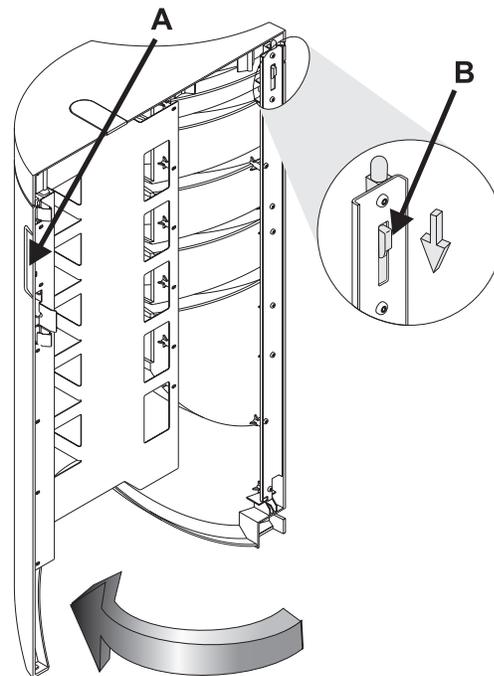


Air moving device (fan)

1.

Remove the rear cover

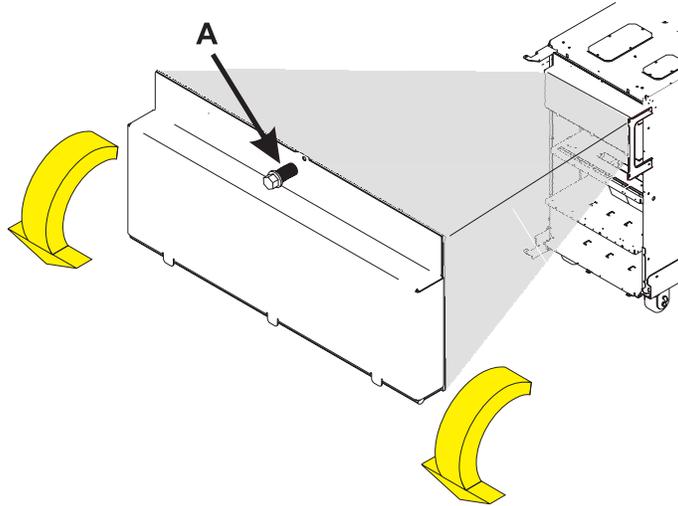
1. Open the cover by grasping its right side (A) and pulling it towards you.
2.
Note: The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



2.

Remove the EMC access plate above the PCI card cage assembly

1. Remove one screw (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.

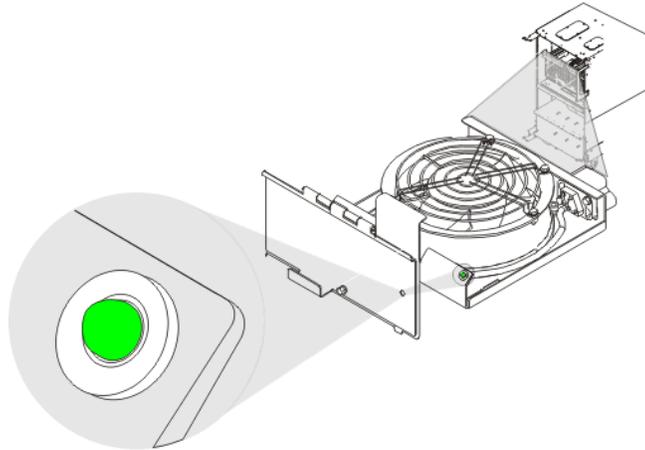


3.

You must determine if the repair can continue concurrently. To continue the repair concurrently, the following condition must be true:

- An air moving device (AMD), which has its green LED on and not blinking, must already be installed at location .

If this condition is not true, the repair can continue only after powering off the unit containing the FRU that is being repaired. If the unit is already powered off, you may proceed with a non-concurrent repair.



4.

Continue the repair concurrently or nonconcurrently.

To continue with power on, go to Step 6 on page 7. Otherwise, continue with the next step.

5.

Use this procedure to service the Air Moving Device (AMD) - B01 and B02.

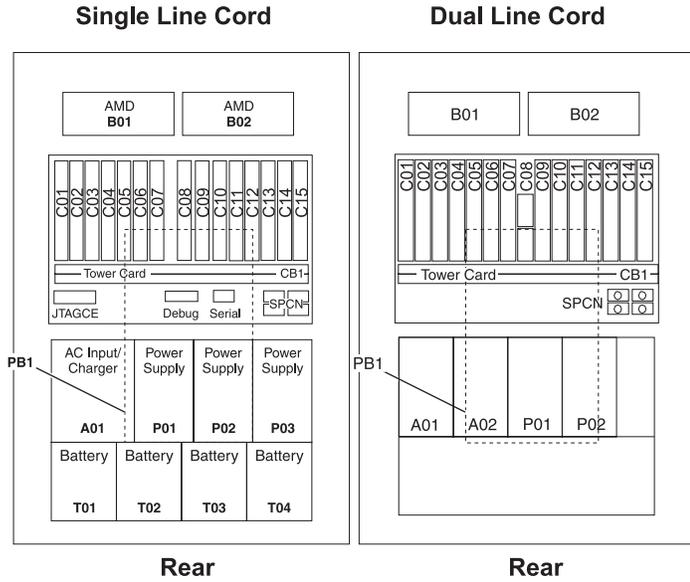
The AMD is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



Continue with Step 7 on page 8

6.

Use this procedure to service the Air Moving Device (AMD) - B01 and B02.

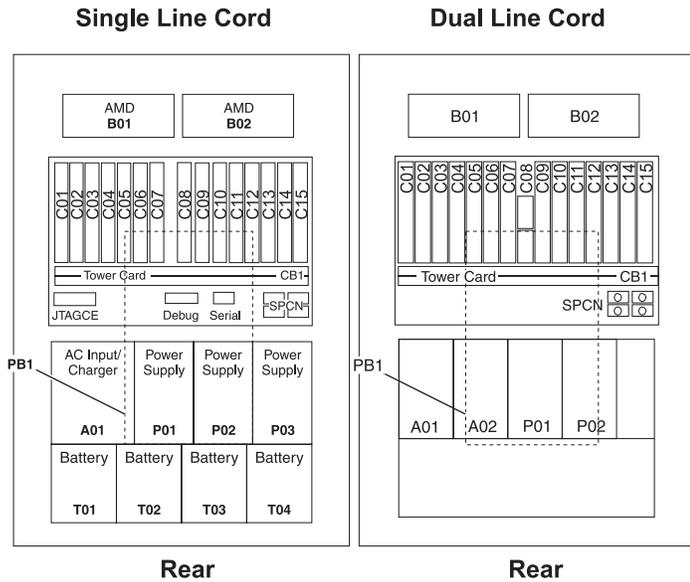
The AMD is in location:

Machine Type:

Model:

Serial Number:

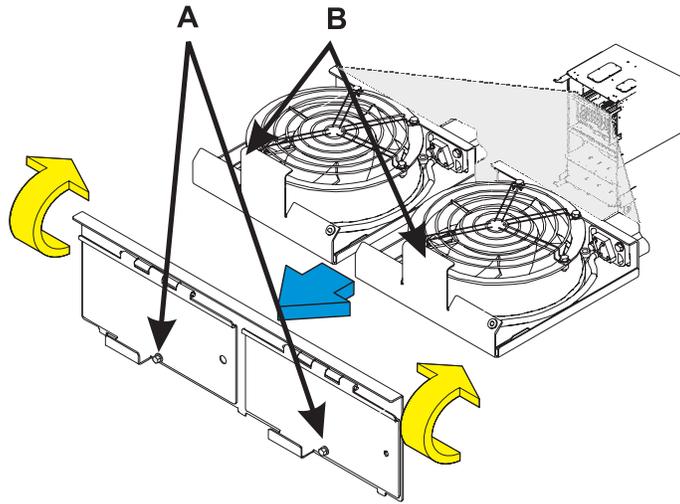
The component will be serviced concurrently. Power should not be removed from the unit containing the FRU in the location field above. Do not remove power to the unit during this repair procedure.



7.

Remove the AMD assembly

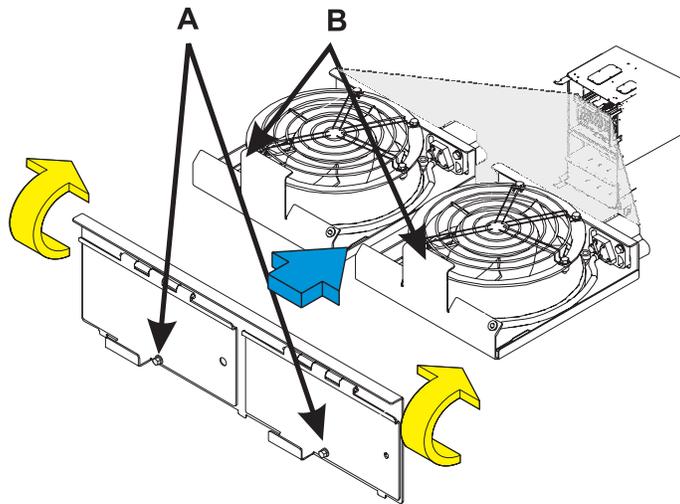
1. Remove the screw (A) from the AMD door assembly for the AMD that you are replacing.
2. Move the cables in front of the AMD you are replacing out of the way.
3. Remove the AMD assembly (B) by sliding it out of the enclosure, while holding the AMD access plate open.



8.

Install the AMD assembly

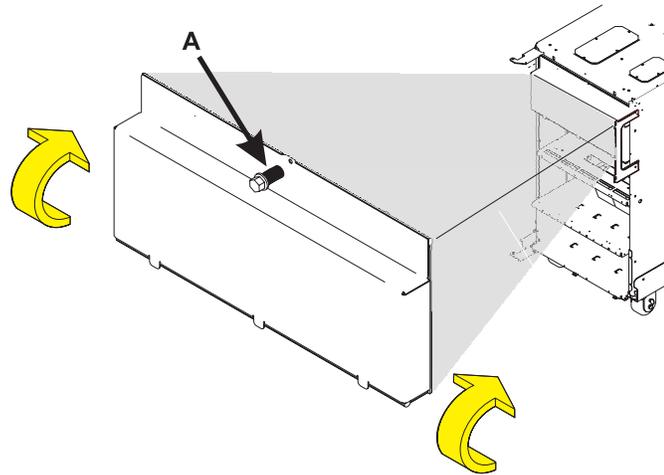
1. Move the cables in front of the AMD enclosure out of the way for the AMD you are installing.
2. Install the AMD assembly (B) by sliding it into the enclosure, while holding the AMD access plate open.
3. Install the screw (A) in the AMD door assembly for the new AMD that you are installing.



9.

Install the EMC access plate above the PCI card cage assembly

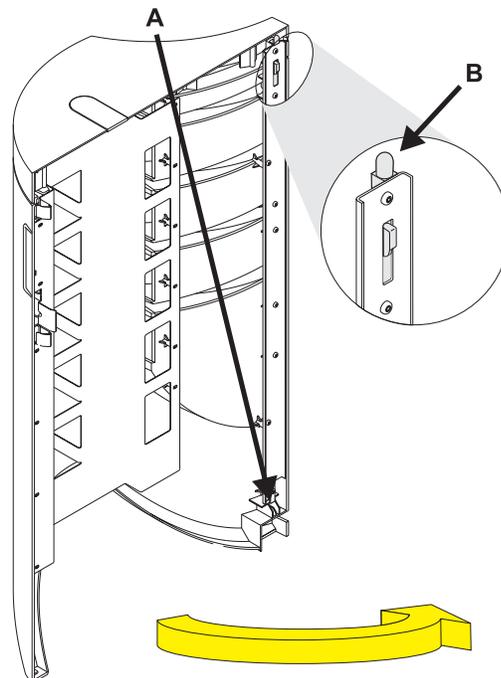
1. Align the three tabs in the EMC access plate with the three notches in the frame.
2. Install one screw (A) in the EMC access plate.



10.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Batteries

1. To replace the batteries with power off, begin with Step 2 on page 10. To replace the batteries with the power on, begin with Step 3 on page 10

2.

Use this procedure to service the Batteries - T01, T02, T03, and T04.

The Battery is in location:

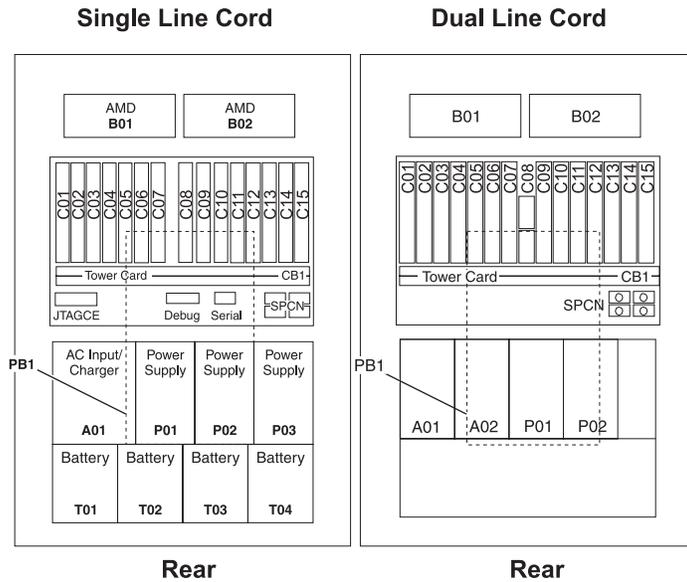
Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.

CAUTION: Be careful when removing the battery power unit. This unit is heavy, but has a weight smaller than 18 kilograms (39.7 pounds). Use care when lifting, removing, or installing this part or unit. (C008)



Continue with Step 4 on page 11

3.

Use this procedure to service the Batteries - T01, T02, T03, and T04.

The Battery is in location:

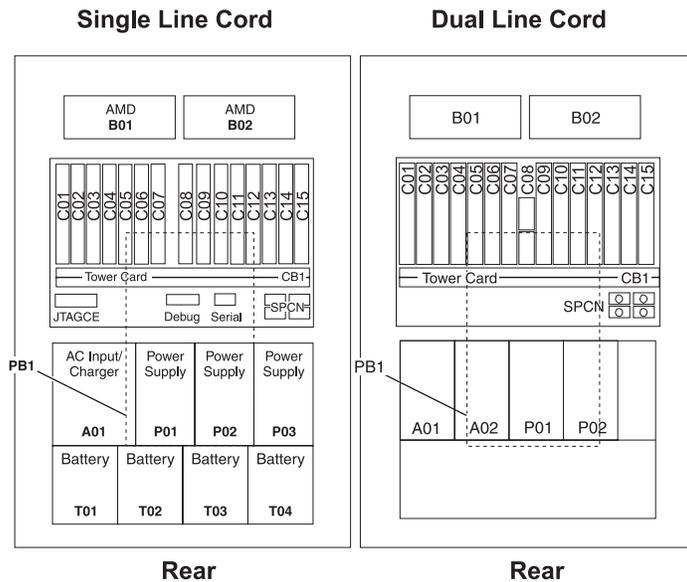
Machine Type:

Model:

Serial Number:

The component will be serviced concurrently. Power should not be removed from the unit containing the FRU in the location field above. Do not remove power to the unit during this repair procedure.

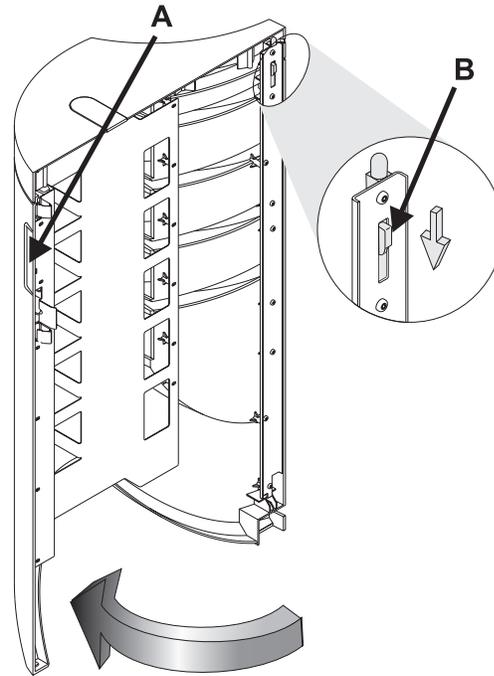
CAUTION: Be careful when removing the battery power unit. This unit is heavy, but has a weight smaller than 18 kilograms (39.7 pounds). Use care when lifting, removing, or installing this part or unit. (C008)



4.

Remove the rear cover

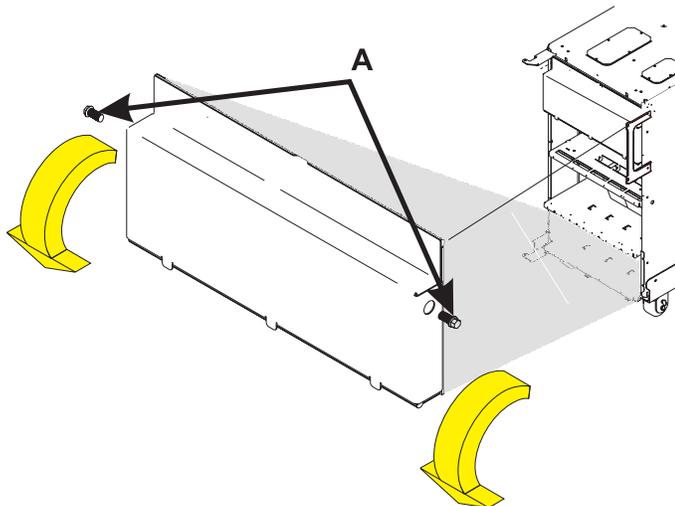
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



5.

Remove the EMC access plate from the battery enclosure

1. Remove two screws (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.



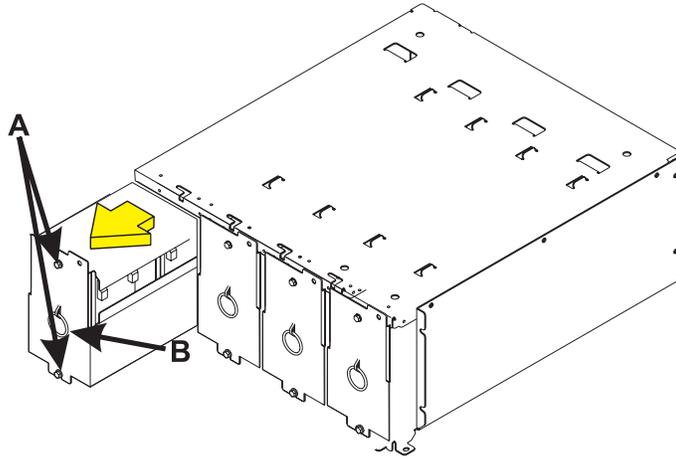
6.

Remove the battery power unit

1. Remove the two screws (A) from the battery unit.
2. Remove the battery power unit by pulling on the ring (B) with one hand, then supporting the bottom of the battery unit with your other hand.

CAUTION: Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn.

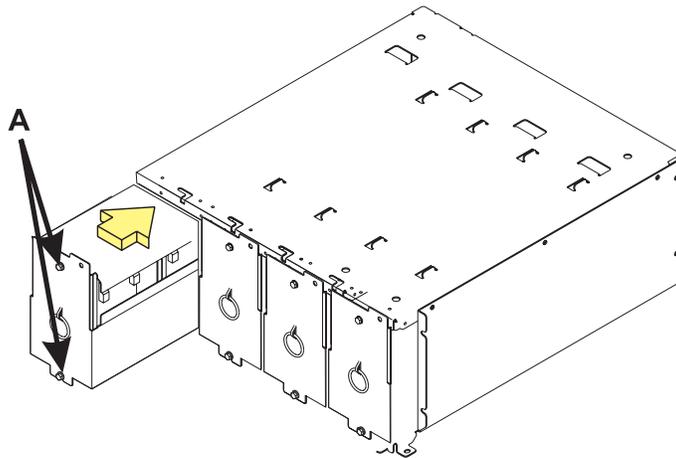
In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)



7.

Install the battery power unit

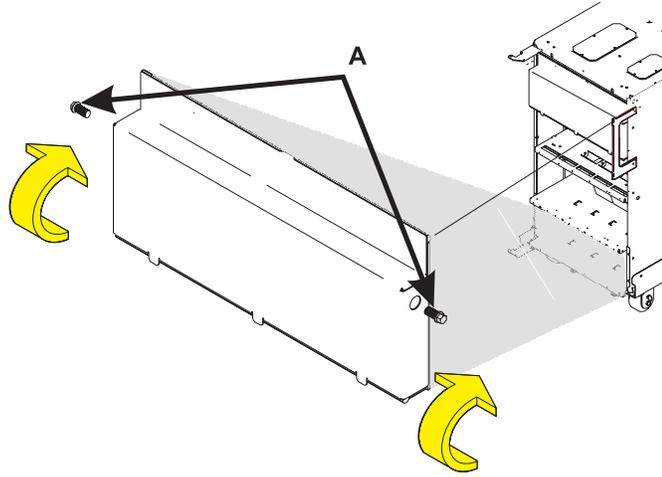
1. Install the battery power unit by sliding it all the way into its slot with both hands.
CAUTION: Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)
2. Install the two screws (A) in the battery unit.



8.

Install the EMC access plate in the battery enclosure

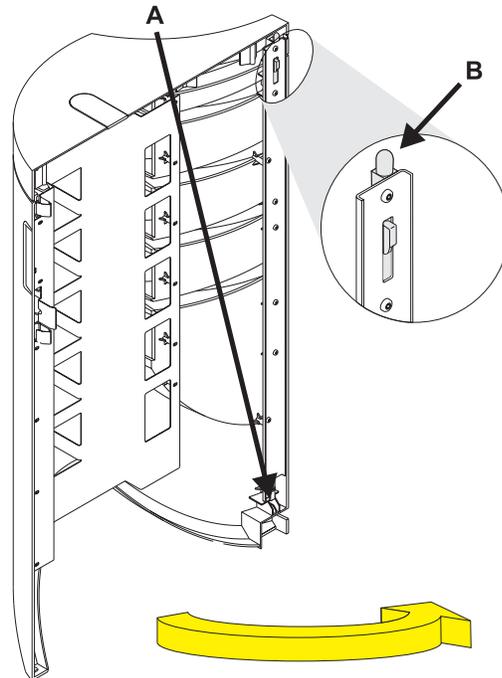
1. Align the three tabs in the EMC access plate with the three notches in the battery enclosure.
2. Install two screws (A) in the EMC access plate.



9.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Device board 1

1.

Use this procedure to service the Device Board - DB1.

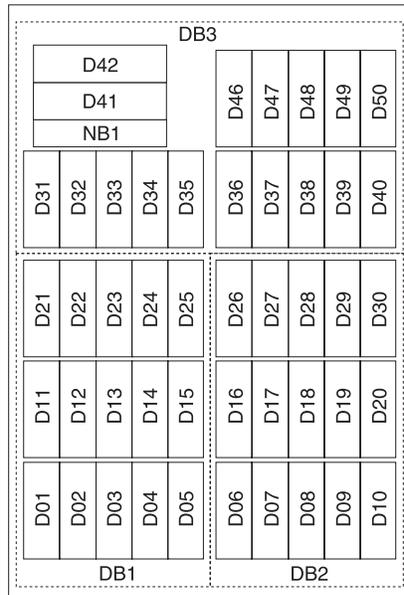
The Device Board is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.

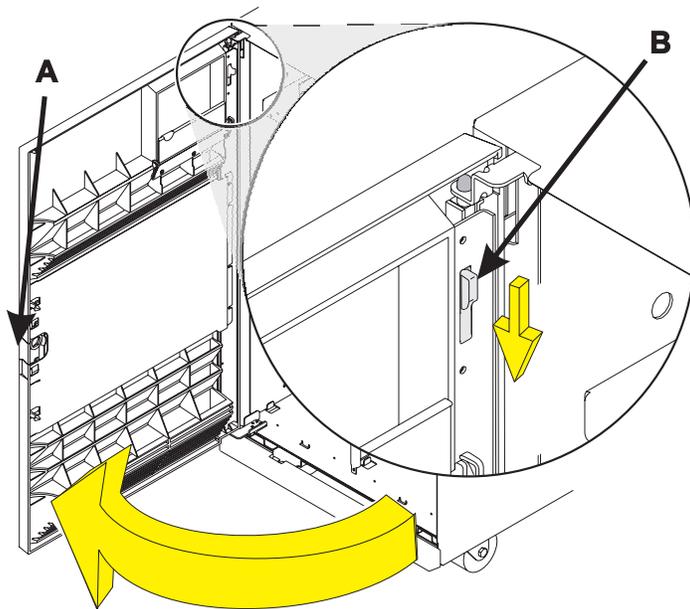


Front

2.

Remove the front cover

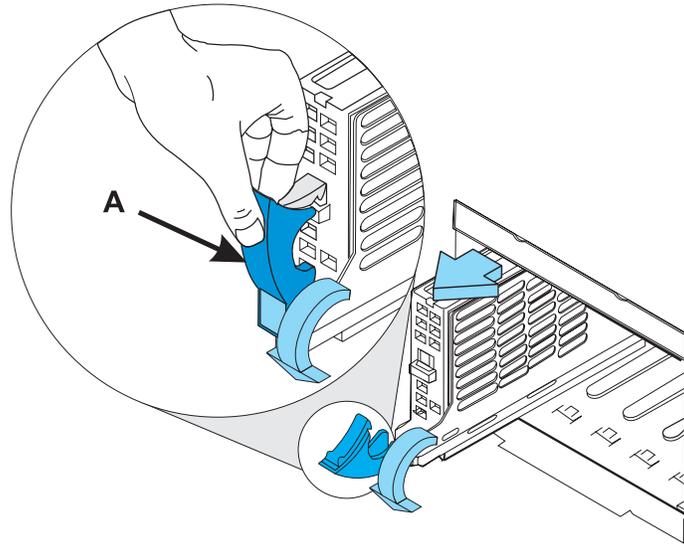
1. Unlock the cover.
2. Open the cover by grasping its right side (A) and pulling it towards you.
3.
Note: The front cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
4. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
5. Tilt the top of the cover away from the tower, and lift the cover off.



5.

Remove the disk unit

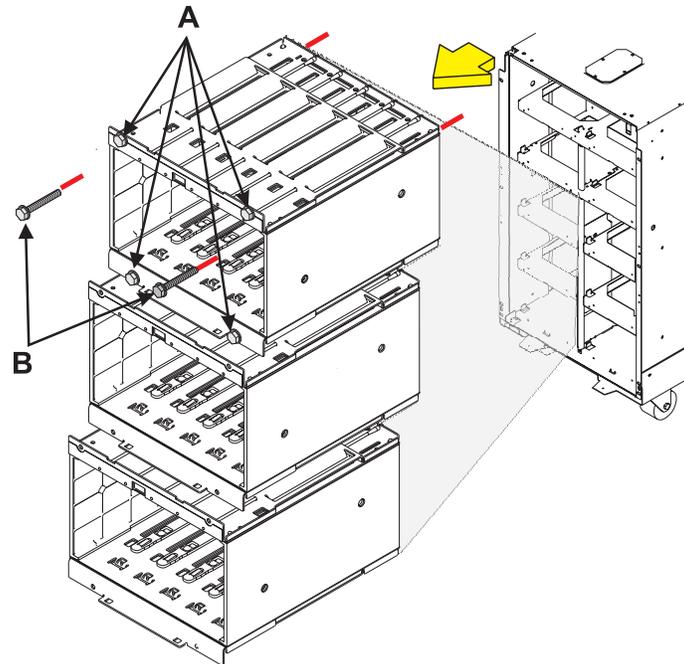
1. Pinch the two surfaces of the latching mechanism together and pull the handle (A) towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



6.

Remove the disk unit enclosures

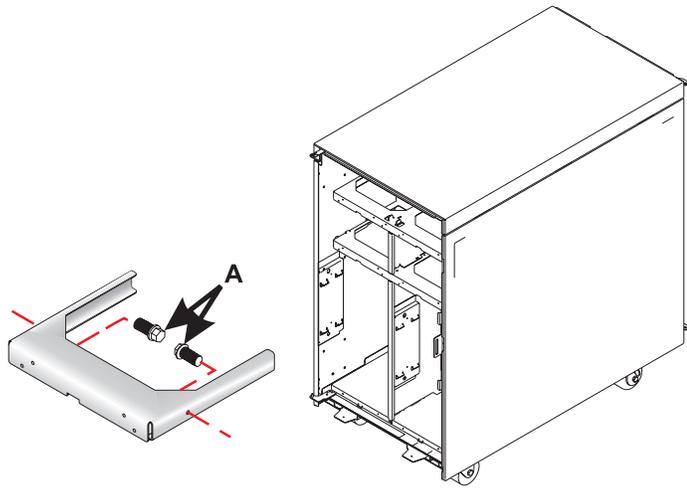
1. Remove the four screws (A) that hold the disk unit enclosure to the frame.
2. Remove the two long retaining screws (B) that are located inside of the disk unit enclosure (the top right and bottom left corners).
3. Remove the disk unit enclosures covering the DB1 board by sliding them straight out of the frame.



7.

Remove the device board shelf

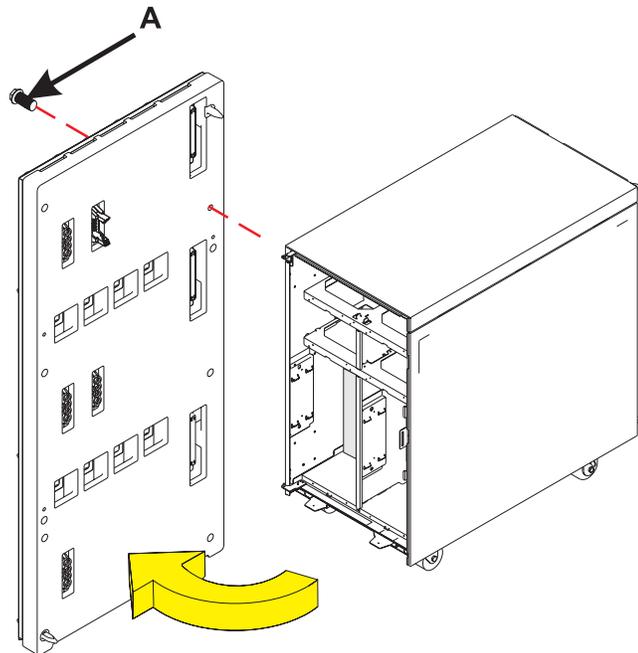
1. Remove the two screws (A) that hold each device board shelf to the frame.
2. Remove the two device board shelves from the frame that are covering DB1.



8.

Remove the device board assembly

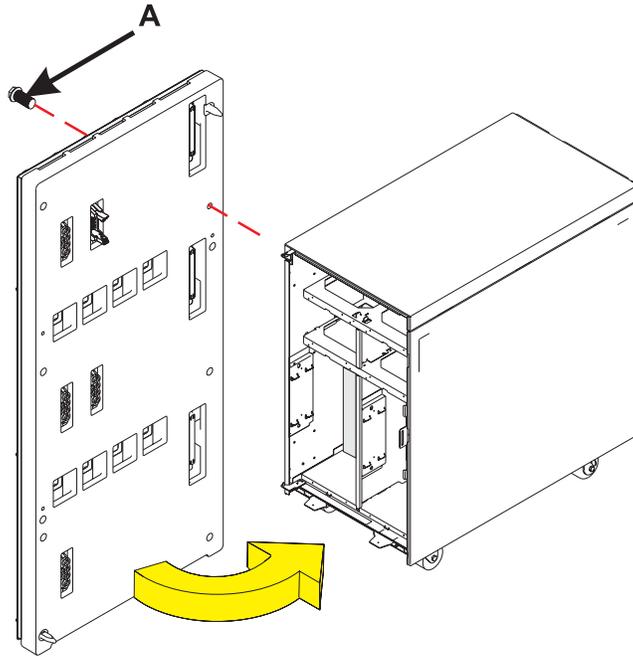
1. Remove the retaining screw (A) that is holding the device board assembly to the frame.
2. Pull the device board assembly out until it slides off the guide pins, then rotate the device board assembly 90 degrees.
3. Label and disconnect all cables from the rear of the DB1 device board assembly.
4. Remove the DB1 device board assembly by pulling it straight out of the frame.



9.

Install the device board assembly

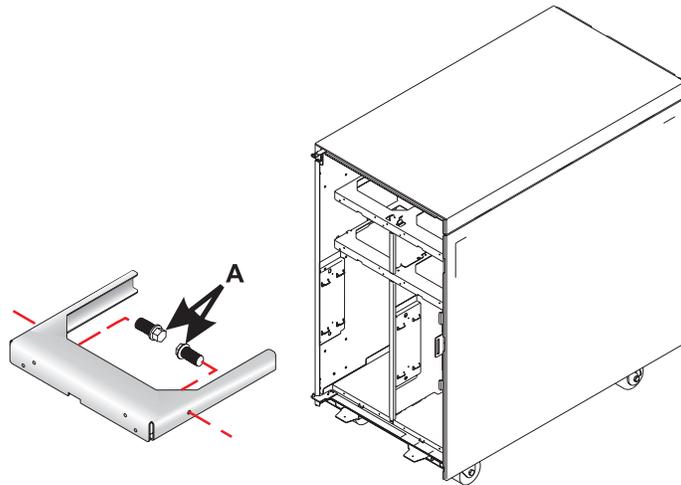
1. Install the DB1 device board assembly into the frame.
2. Connect the cables that were previously removed to the rear of the DB1 device board assembly.
3. Rotate the device board assembly 90 degrees, then push the device board assembly towards the frame until it slides onto the guide pins.
4. Install the retaining screw (A) that holds the DB1 device board assembly to the frame.



10.

Install the device board shelf

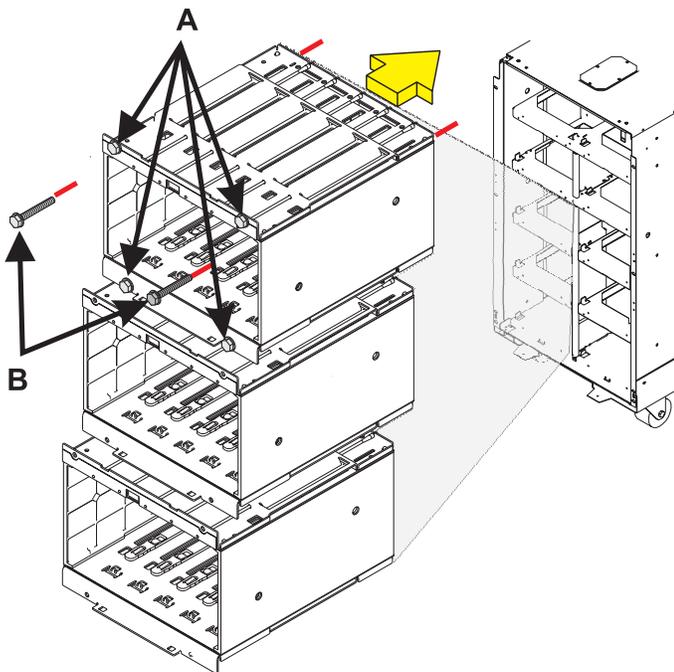
1. Install the two device board shelves that cover DB1 in the frame.
2. Install the two screws (A) that hold each device board shelf to the frame.



11.

Install the disk unit enclosures

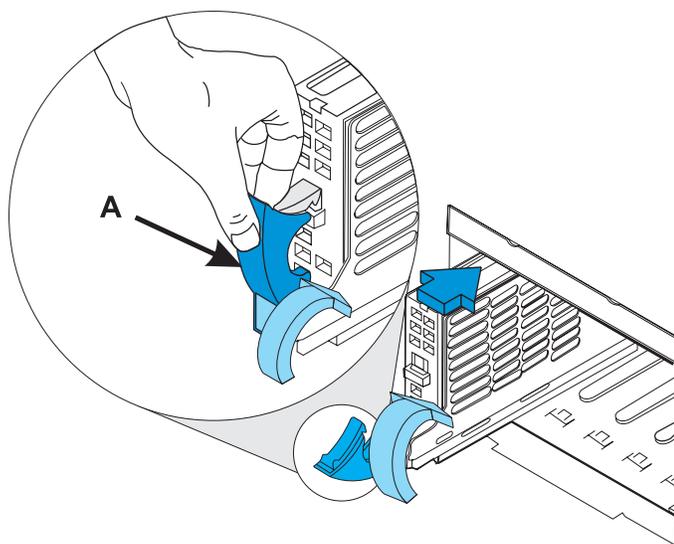
1. Install the disk unit enclosures, making sure to line up the guide pins when sliding the enclosures in.
2. Install the two long retaining screws (**B**) inside of the disk unit enclosure (the top right and bottom left corners).
3. Install the four screws (**A**) that hold the disk unit enclosure to the frame.



12.

Install the disk unit

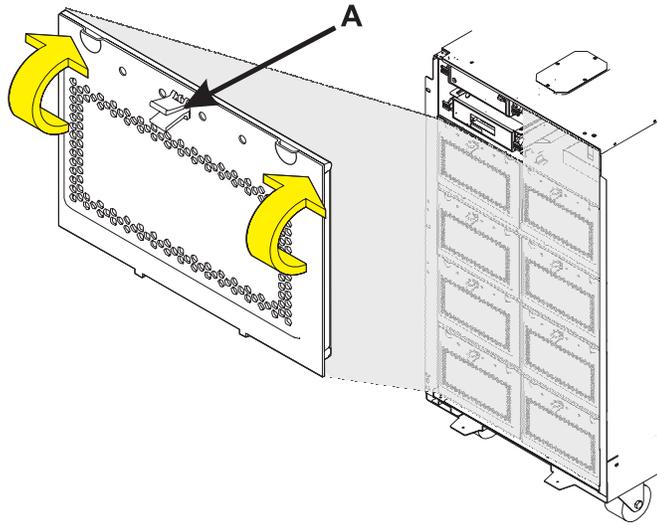
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle (**A**) down, then pushing the handle upward to lock it into place.



13.

Install the EMC access plate in the disk unit enclosure

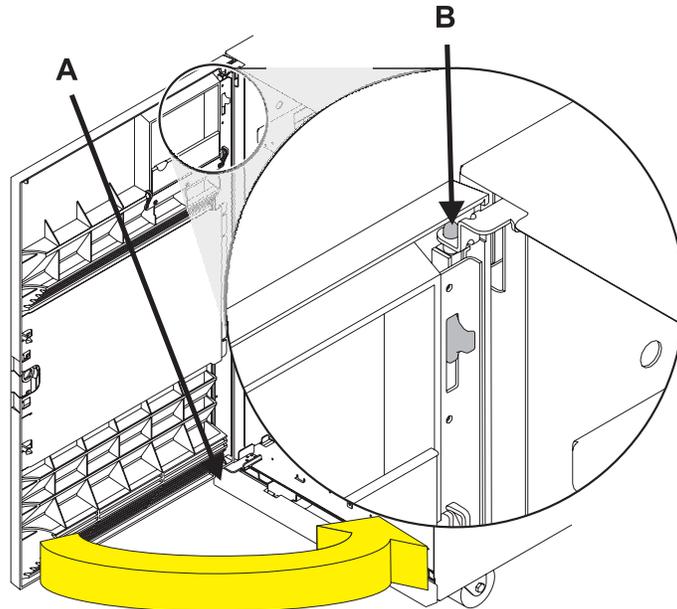
1. Align the two tabs in the EMC access plate with the two notches in the disk unit enclosure.
2. Push the top of the access plate towards the frame until the latching mechanism (A) engages.



14.

Install the front cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Device board 2

1.

Use this procedure to service the Device Board - DB2.

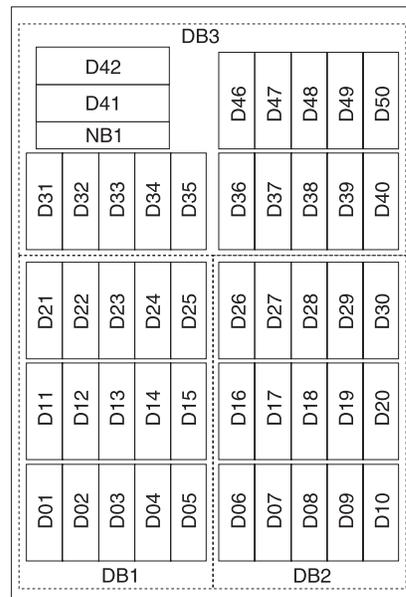
The Device Board is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.

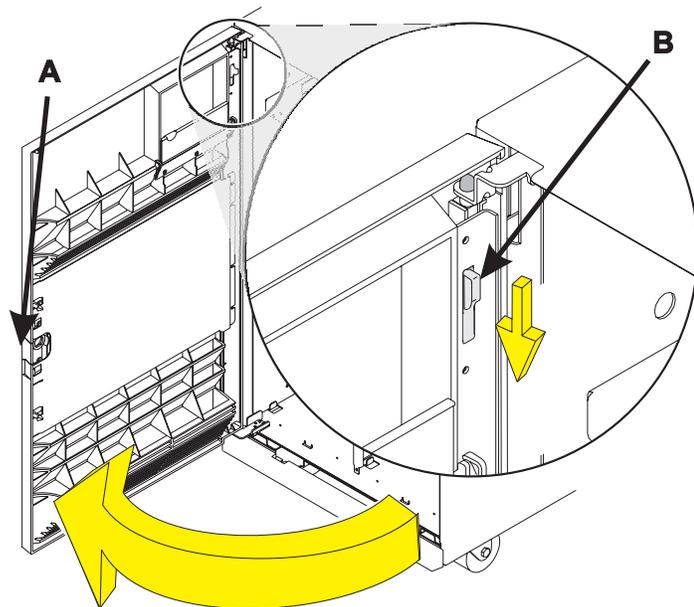


Front

2.

Remove the front cover

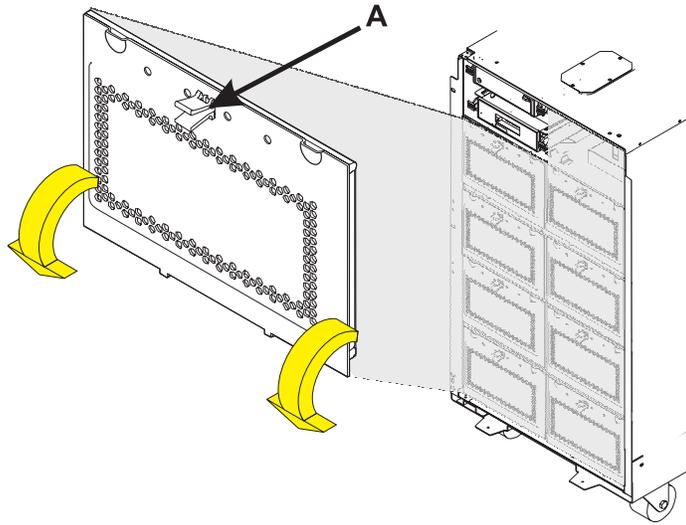
1. Unlock the cover.
2. Open the cover by grasping its right side (A) and pulling it towards you.
3. **Note:** The front cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
4. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
5. Tilt the top of the cover away from the tower, and lift the cover off.



3.

Remove the EMC access plate from the disk unit enclosure

Press the latching mechanism (A) together and tilt the top of the access plate away from the frame to remove it.



4.

Record the disk unit locations

1. Record the locations of the disk units that are currently installed in the DB2 device board.
2. Label each disk unit in the DB2 device board with the appropriate location. Valid disk unit locations for DB2 include D06, D07, D08, D09, D10, D16, D17, D18, D19, D20, D26, D27, D28, D29, and D30.

Note: Use the following disk unit removal procedures to remove all the disk units in the DB2 deviceboard.

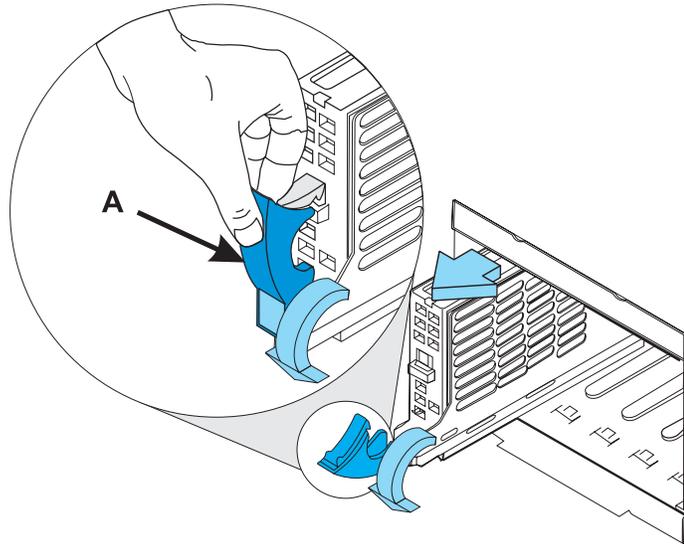
DB3										
Tape D42		Optical D41		OP Panel NB1		Disk Unit D46	Disk Unit D47	Disk Unit D48	Disk Unit D49	Disk Unit D50
Disk Unit D31	Disk Unit D32	Disk Unit D33	Disk Unit D34	Disk Unit D35	Disk Unit D36	Disk Unit D37	Disk Unit D38	Disk Unit D39	Disk Unit D40	
Disk Unit D21	Disk Unit D22	Disk Unit D23	Disk Unit D24	Disk Unit D25	Disk Unit D26	Disk Unit D27	Disk Unit D28	Disk Unit D29	Disk Unit D30	
Disk Unit D11	Disk Unit D12	Disk Unit D13	Disk Unit D14	Disk Unit D15	Disk Unit D16	Disk Unit D17	Disk Unit D18	Disk Unit D19	Disk Unit D20	
Disk Unit D01	Disk Unit D02	Disk Unit D03	Disk Unit D04	Disk Unit D05	Disk Unit D06	Disk Unit D07	Disk Unit D08	Disk Unit D09	Disk Unit D10	
DB1					DB2					

Front

5.

Remove the disk unit

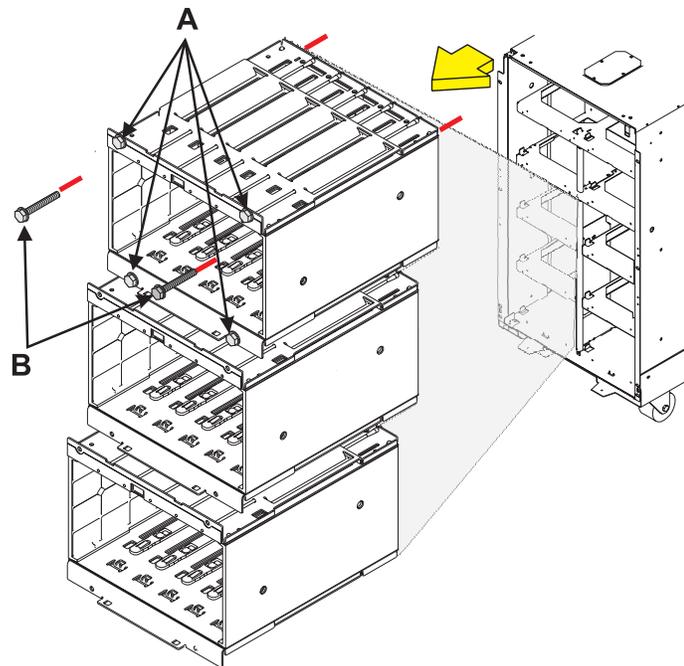
1. Pinch the two surfaces of the latching mechanism together and pull the handle (A) towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



6.

Remove the disk unit enclosures

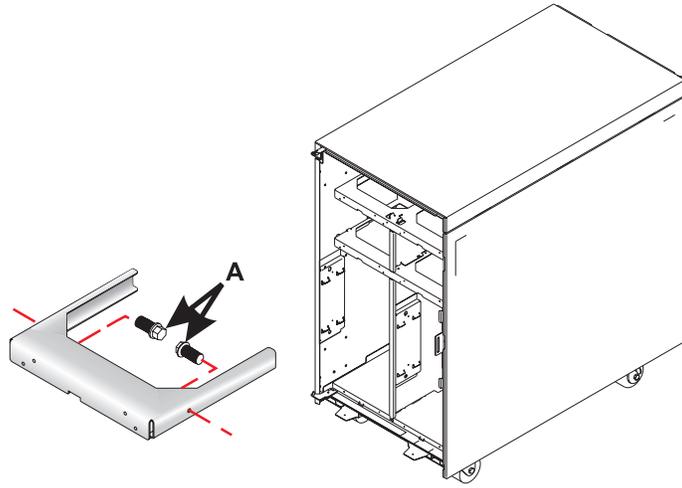
1. Remove the four screws (A) that hold the disk unit enclosure to the frame.
2. Remove the two long retaining screws (B) that are located inside of the disk unit enclosure (the top right and bottom left corners).
3. Remove the disk unit enclosures covering the DB2 board by sliding them straight out of the frame.



7.

Remove the device board shelf

1. Remove the two screws (A) that hold each device board shelf to the frame.
2. Remove the two device board shelves from the frame that are covering DB2.



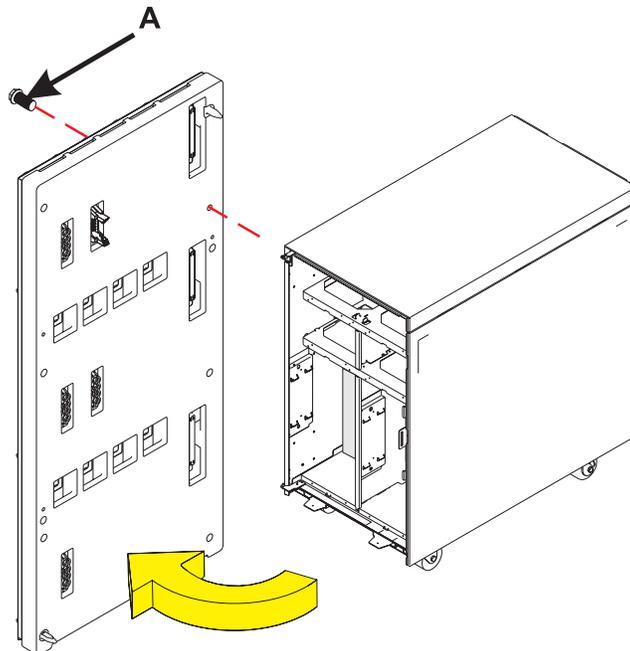
8.

Remove the device board assembly

1. Remove the retaining screw (A) that is holding the device board assembly to the frame.
2. Pull the device board assembly out until it slides off the guide pins, then rotate the device board assembly 90 degrees.

Note: The video being displayed for this step shows the DB1 device board, but the motion of rotating the board is identical to DB2.

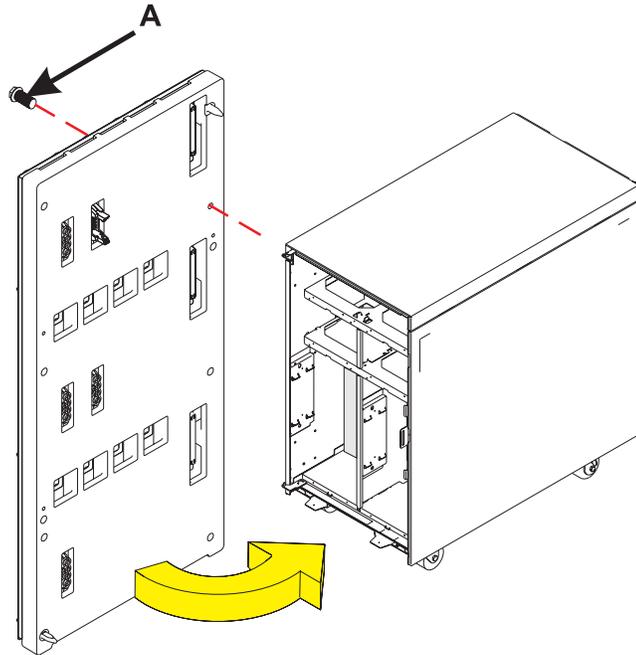
3. Label and disconnect all cables from the rear of the DB2 device board assembly.
4. Remove the DB2 device board assembly by pulling it straight out of the frame.



9.

Install the device board assembly

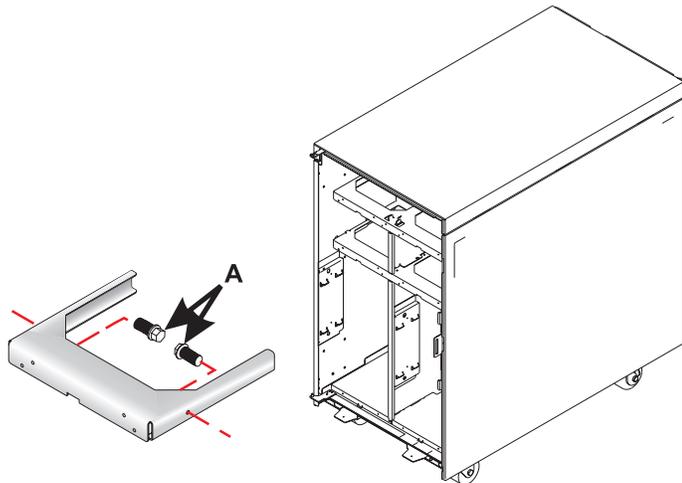
1. Install the DB2 device board assembly into the frame.
2. Connect the cables that were previously removed to the rear of the DB2 device board assembly.
3. Rotate the device board assembly 90 degrees, then push the device board assembly towards the frame until it slides onto the guide pins.
4. Install the retaining screw (A) that holds the DB2 device board assembly to the frame.



10.

Install the device board shelf

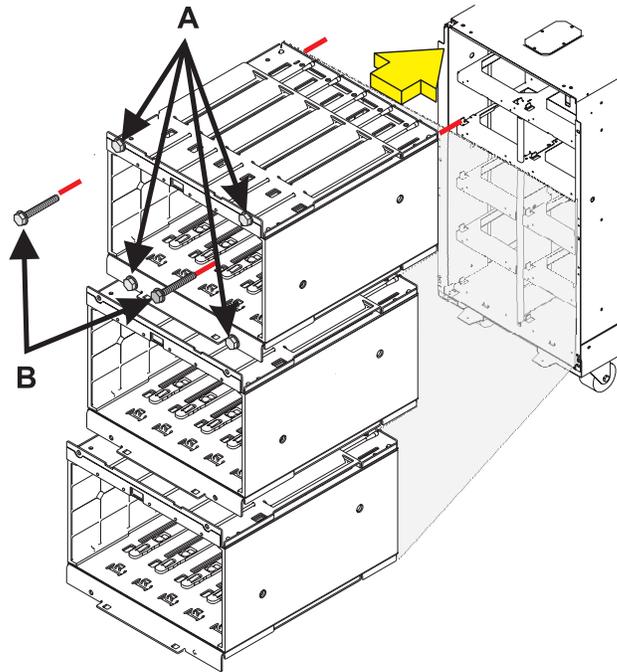
1. Install the two device board shelves that cover DB2 in the frame.
2. Install the two screws (A) that hold each device board shelf to the frame.



11.

Install the disk unit enclosures

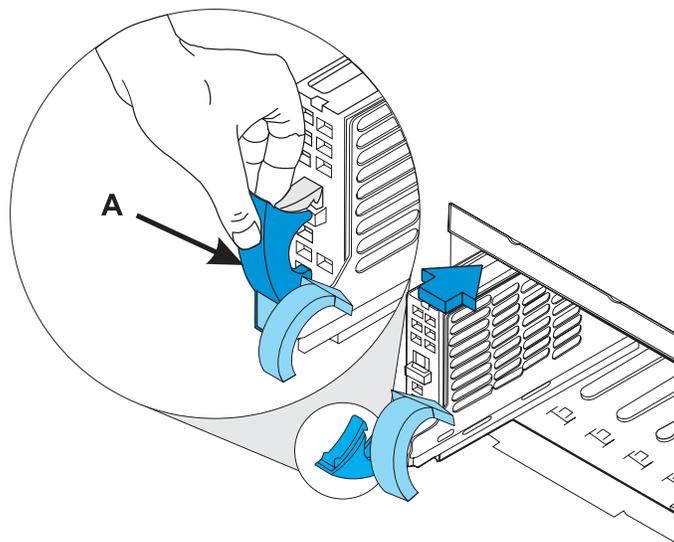
1. Install the disk unit enclosures, making sure to line up the guide pins when sliding the enclosures in.
2. Install the two long retaining screws (**B**) inside of the disk unit enclosure (the top right and bottom left corners).
3. Install the four screws (**A**) that hold the disk unit enclosure to the frame.



12.

Install the disk unit

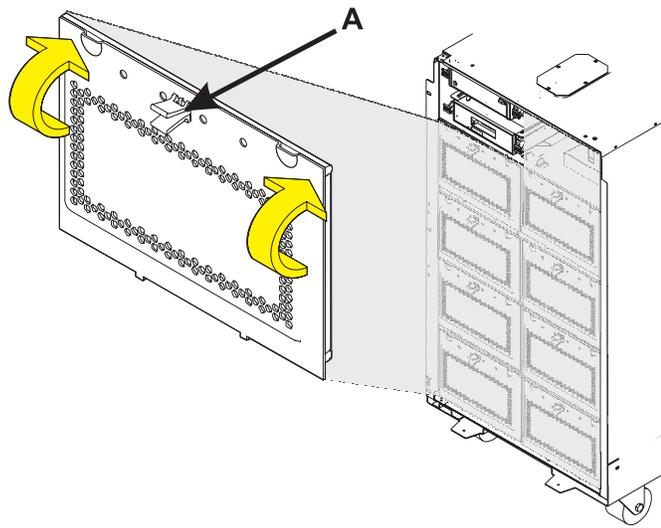
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle (**A**) down, then pushing the handle upward to lock it into place.



13.

Install the EMC access plate in the disk unit enclosure

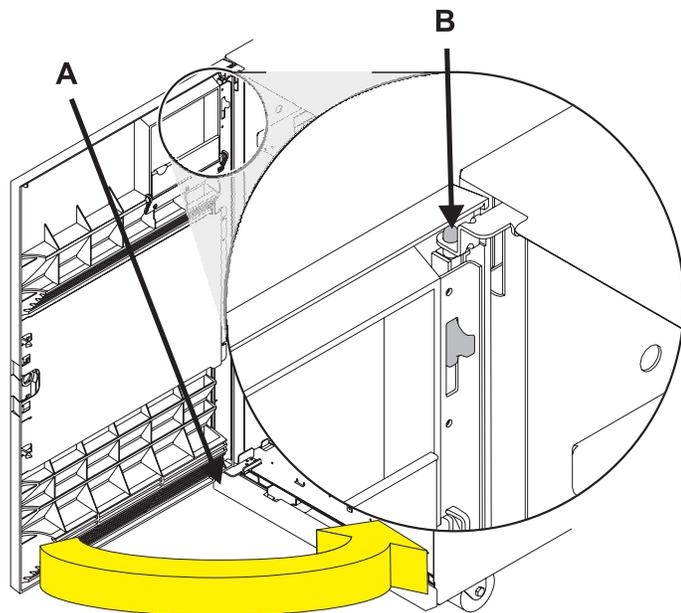
1. Align the two tabs in the EMC access plate with the two notches in the disk unit enclosure.
2. Push the top of the access plate towards the frame until the latching mechanism (A) engages.



14.

Install the front cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Device board 3

1.

Use this procedure to service the Device Board - DB3.

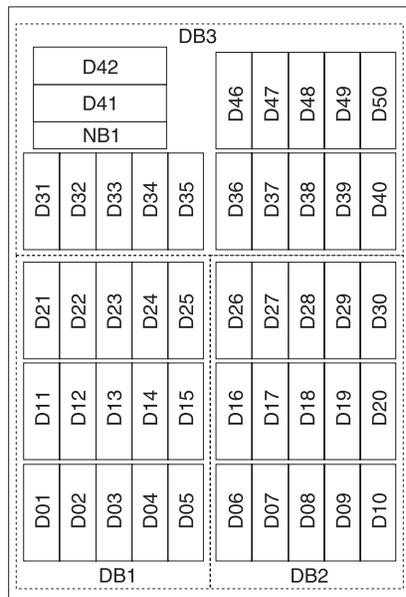
The Device Board is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



Front

2.

Remove the rear cover

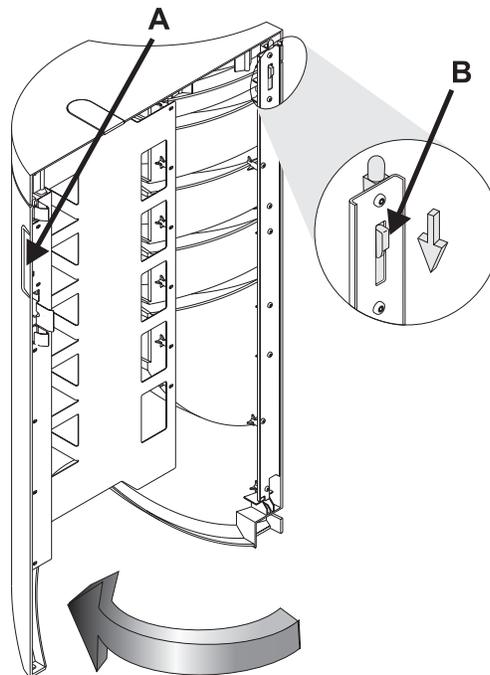
1. Open the cover by grasping its right side (A) and pulling it towards you.

2.

Note: The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.

3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.

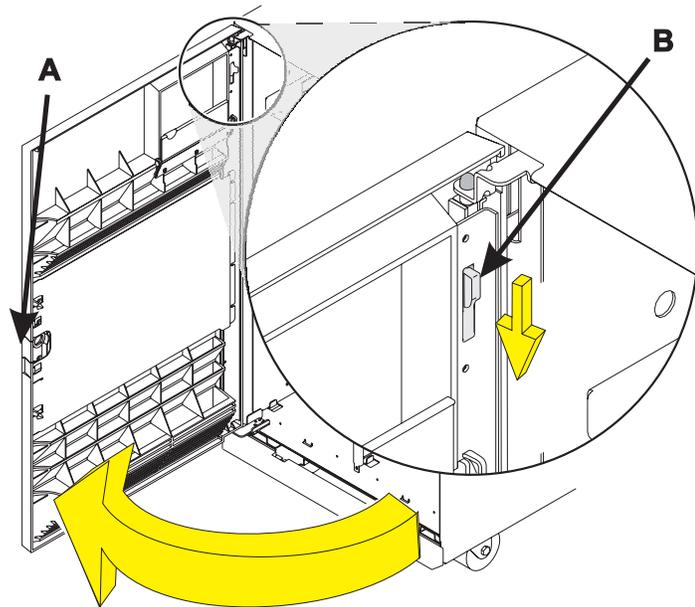
4. Tilt the top of the cover away from the tower, and lift the cover off.



3.

Remove the front cover

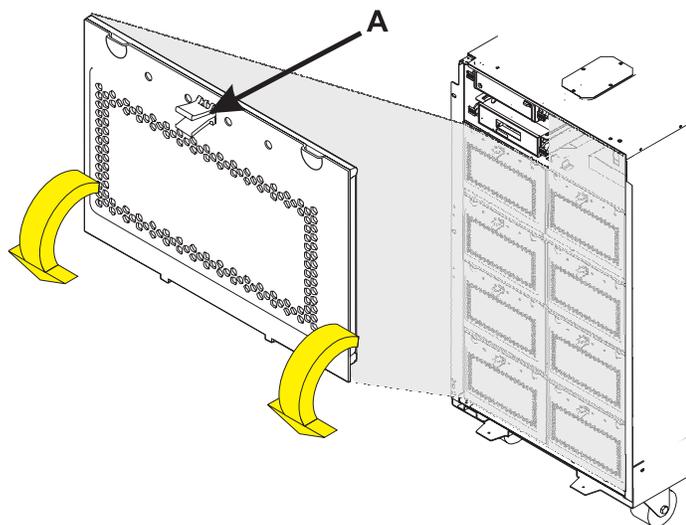
1. Unlock the cover.
2. Open the cover by grasping its right side (A) and pulling it towards you.
3.
Note: The front cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
4. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
5. Tilt the top of the cover away from the tower, and lift the cover off.



4.

Remove the EMC access plate from the disk unit enclosure

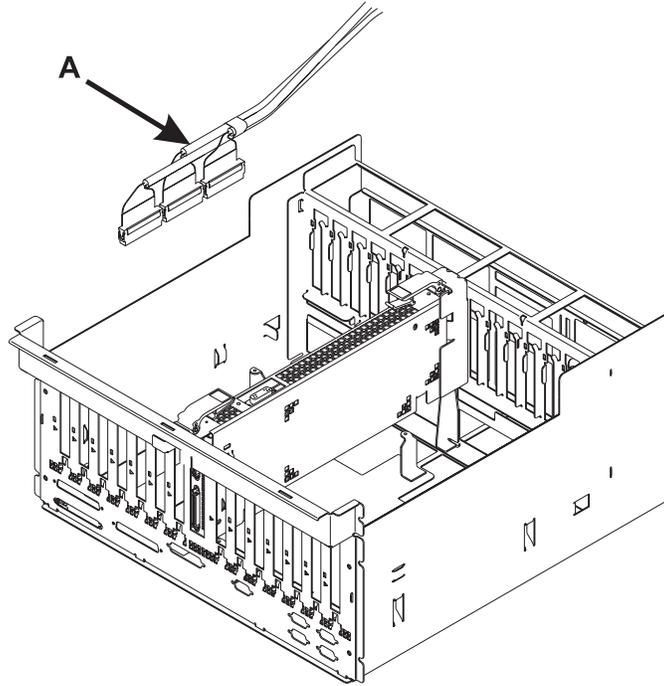
Press the latching mechanism (A) together and tilt the top of the access plate away from the frame to remove it.



5.

Remove the PCI card cage assembly cables

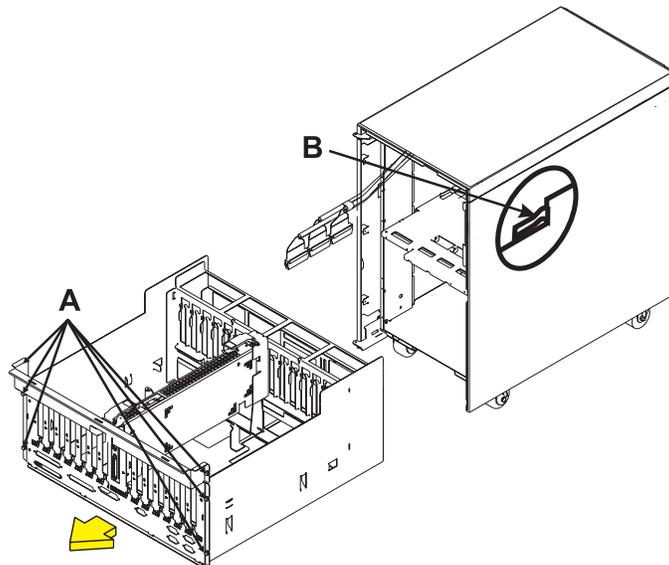
1. Label (if necessary) and disconnect the SCSI cables (**A**) from the top of the DASD controller cards.
2. Label (if necessary) and disconnect the external cables from the PCI cards.



6.

Remove the PCI card cage assembly

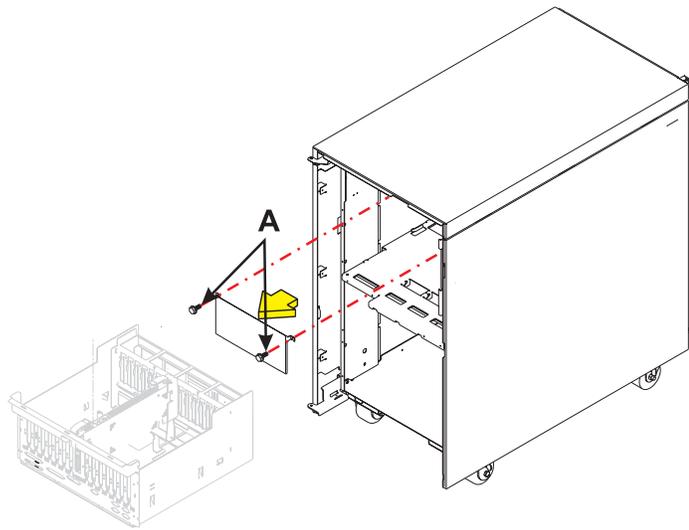
1. Remove the six screws (**A**).
2. Pull the PCI card cage assembly partially out of the frame while holding the cables away from the assembly.
3. Press the release mechanism (**B**) and carefully slide the assembly out of the frame.



7.

Remove the bulkhead cover

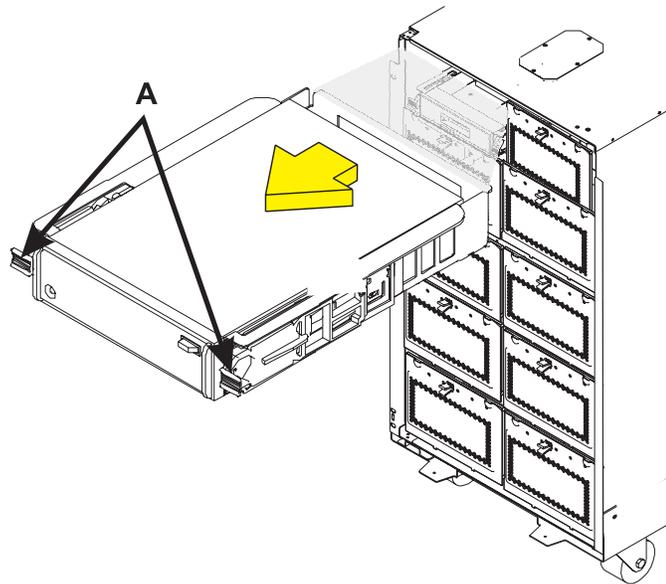
1. Remove the two screws (**A**) from the bulkhead cover located inside the frame and directly above the power distribution board.
2. Remove the bulkhead cover from the frame.
3. Reach through the opening where the bulkhead cover was removed from and label (record the locations of) all cables that are connected to the rear of the device board assembly (DB3).
4. Disconnect all cables that are connected to the rear of the device board assembly (DB3).



8.

Remove the removable media unit

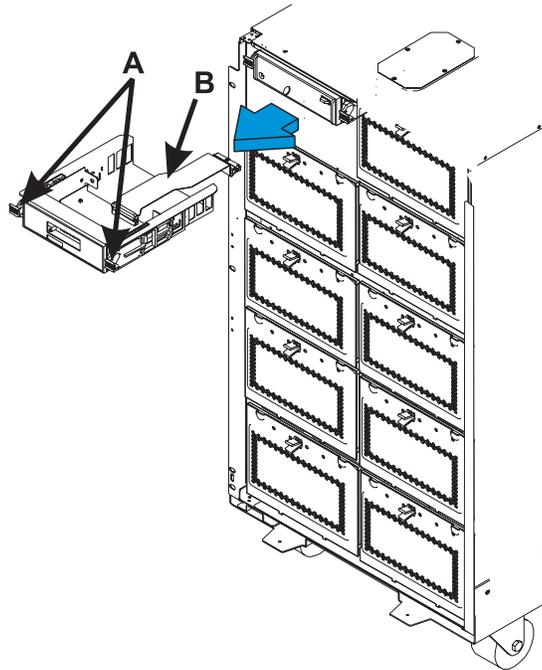
From the front of the expansion tower, note the removable media locations and remove them by pulling out on the handles (**A**) located on each side of the unit and sliding the unit straight out of the enclosure.



9.

Remove the display panel

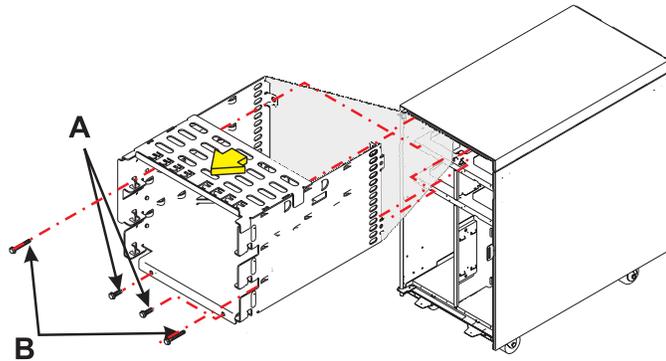
1. Remove the display panel by pulling out on the two side handles **(A)** and sliding the display panel partially out of the frame.
2. Disconnect the cable **(B)** that is attached to the rear of the display panel.
3. Remove the display panel from the frame.



10.

Remove the removable media enclosure

1. Unplug the other end of the display panel cable from the base device board assembly (DB3) and set the cable aside.
2. Remove the two screws **(A)** that hold the removable media enclosure to the frame.
3. Remove the two long retaining screws **(B)** that are located inside of the removable media enclosure (the top right and lower left corners).
4. Remove the removable media enclosure by sliding it straight out of the frame.

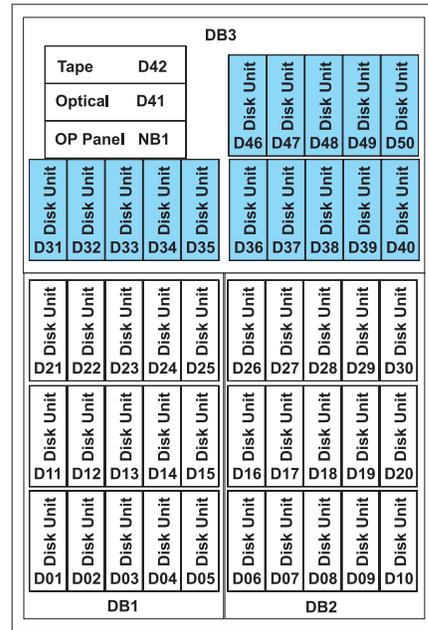


11.

Record the disk unit locations

1. Record the locations of the disk units that are currently installed in the DB3 device board.
2. Label each disk unit in the DB3 device board with the appropriate location. Valid disk unit locations for DB3 include D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D46, D47, D48, D49, and D50.

Note: Use the following disk unit removal procedures to remove all the disk units in the DB3 deviceboard.

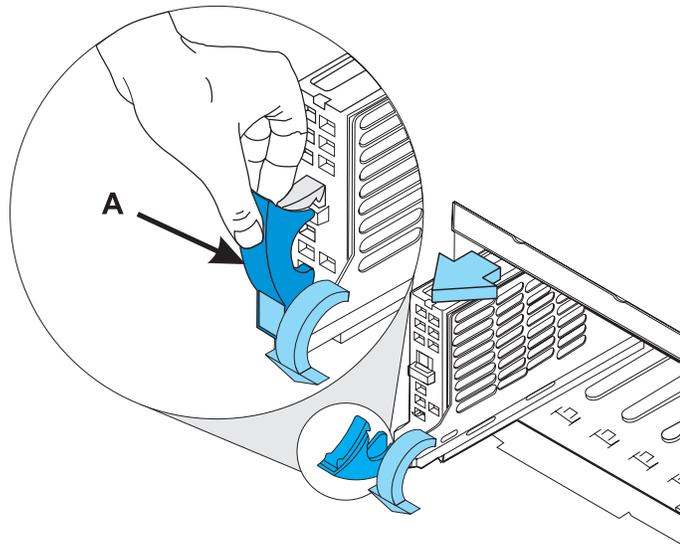


Front

12.

Remove the disk unit

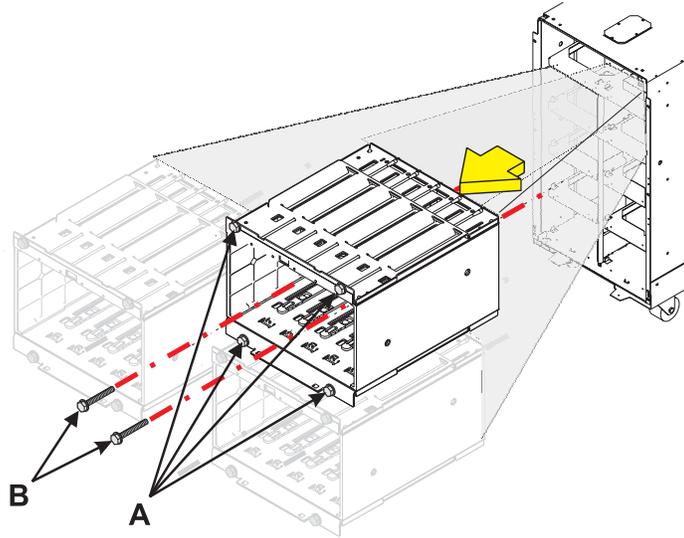
1. Pinch the two surfaces of the latching mechanism together and pull the handle (A) towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



13.

Remove the disk unit enclosures

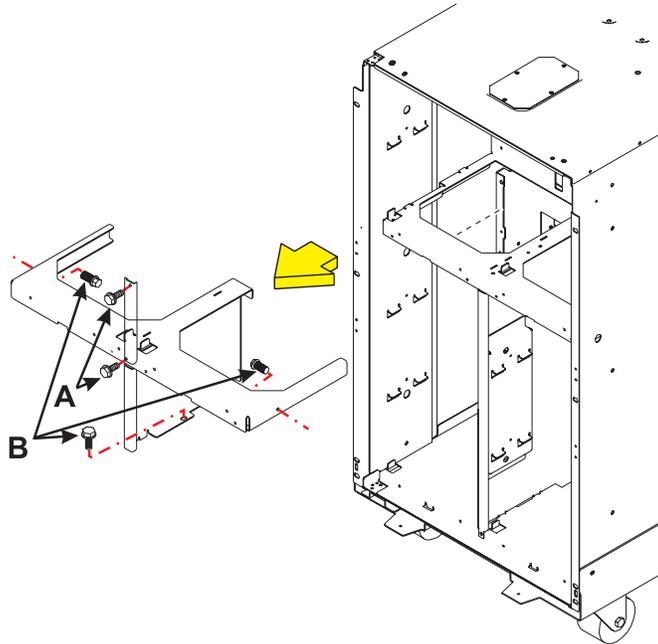
1. Remove the four screws (A) that hold the disk unit enclosure to the frame.
2. Remove the two long retaining screws (B) that are located inside the disk unit enclosure (the top right and bottom left corners).
3. Remove the disk unit enclosures covering the DB3 board by sliding them straight out of the frame.



14.

Remove the DB3 device board shelf

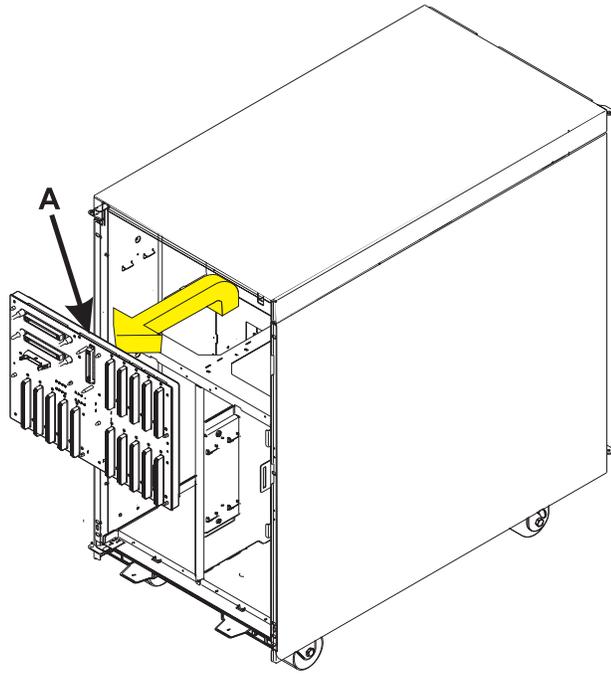
1. Remove the two screws (A) that hold the center support bracket to the frame.
2. Remove the three screws (B) that hold the device board shelf in front of DB3 to the frame.
3. Remove the center support bracket and DB3 device board shelf by pulling them out of the unit.



15.

Remove the DB3 device board assembly

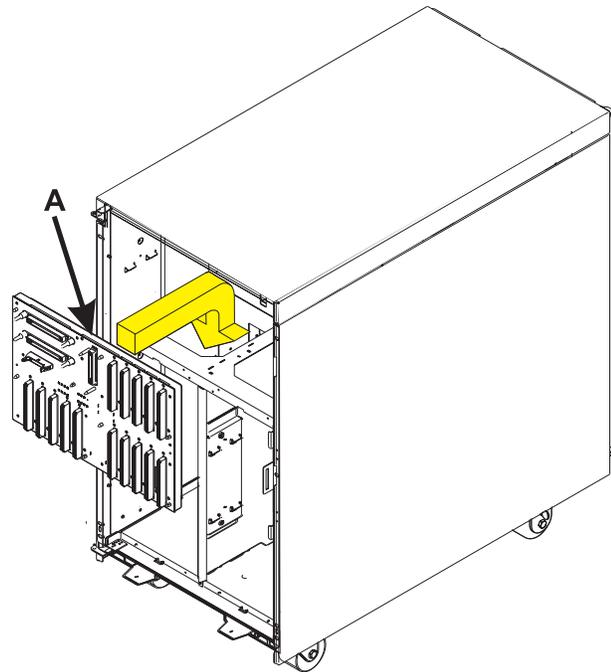
Remove the DB3 base device board assembly (A) by tilting the top towards you, then pulling the device board assembly out of the frame.



16.

Install the DB3 device board assembly

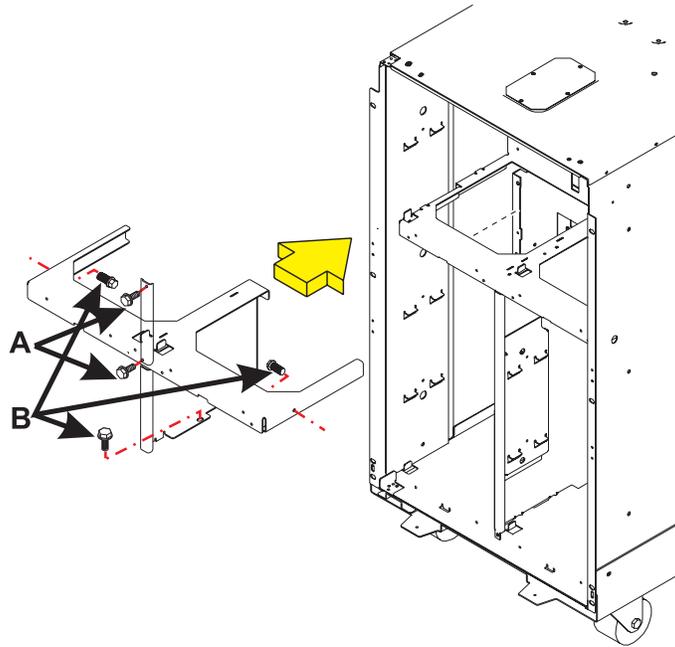
Install the DB3 base device board assembly (A) by tilting the top towards you, then horizontally sliding the board into the frame as you rotate the bottom of the board downward.



17.

Install the DB3 device board shelf

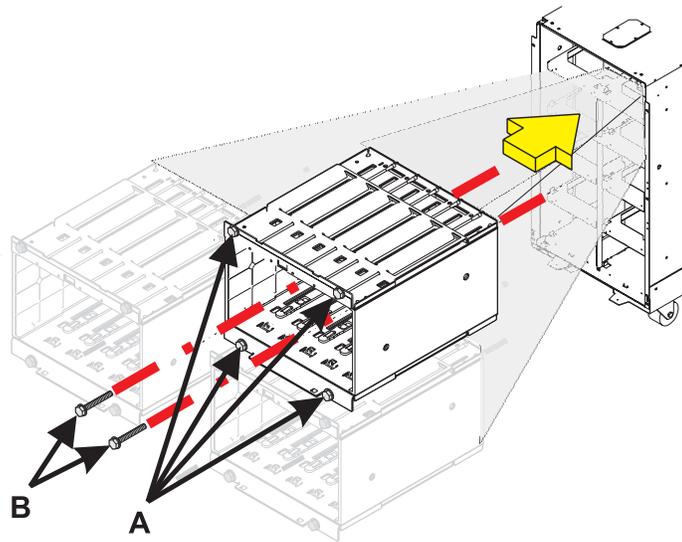
1. Slide the DB3 device board shelf into the unit.
2. Install the three screws (**B**) that hold the device board shelf to the frame.
3. Slide the center support bracket into the unit.
4. Install the two screws (**A**) that hold the center support bracket to the frame.



18.

Install the disk unit enclosures

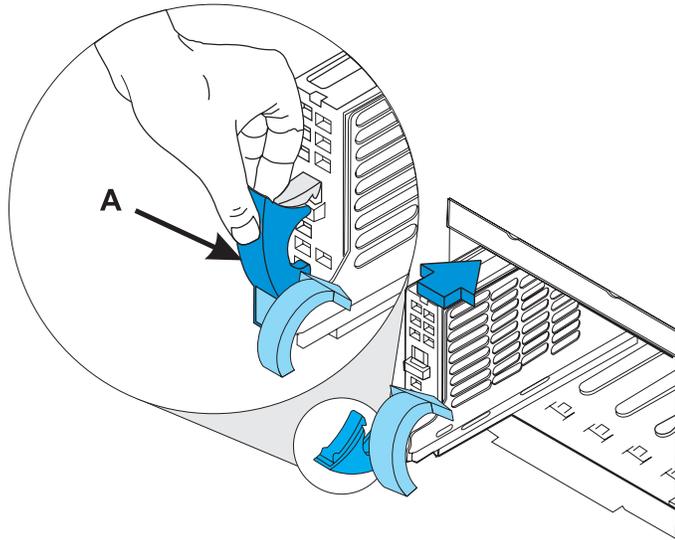
1. Install the disk unit enclosures in front of the DB3 board, making sure to line up the guide pins when sliding the enclosures into the frame.
2. Install the two long retaining screws (**B**) inside of the disk unit enclosure (the top right and bottom left corners).
3. Install the four screws (**A**) that hold the disk unit enclosure to the frame.



19.

Install the disk unit

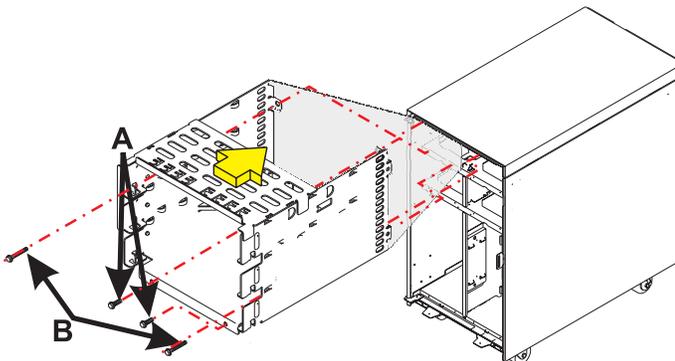
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle (A) down, then pushing the handle upward to lock it into place.



20.

Install the removable media enclosure

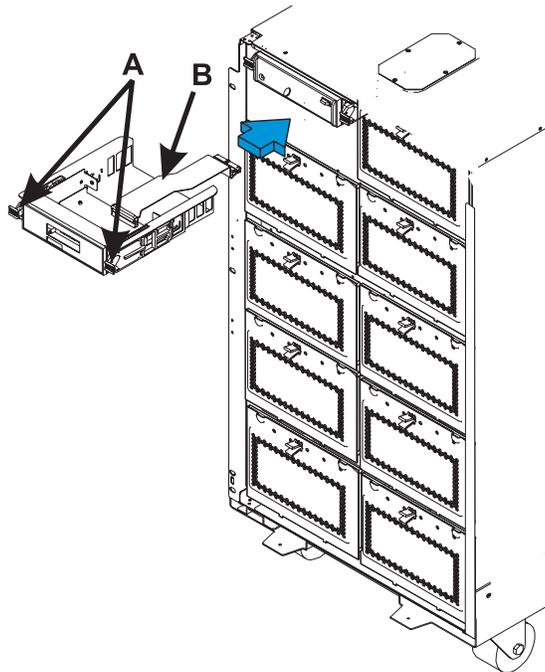
1. Install the removable media enclosure, making sure to line up the guide pins when sliding the enclosure into the frame.
2. Install the two long retaining screws (B) inside of the removable media enclosure (the top right and lower left corners).
3. Install the two screws (A) that hold the removable media enclosure to the frame.
4. Connect one end of the display panel cable to the base device board assembly (DB3).



21.

Install the display panel

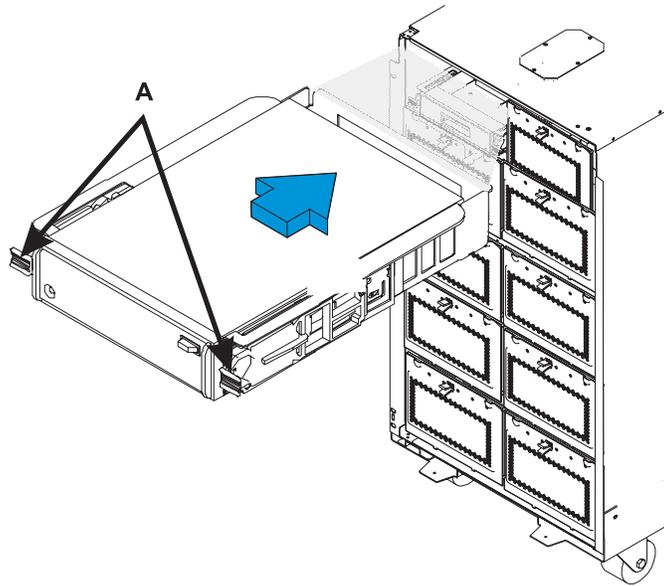
1. Slide the new display panel assembly partially into the frame by pushing in on the handles (A) on each side of the assembly.
2. Connect the end of the display panel cable (B) to the rear of the display panel.
3. Install the display panel by pushing in on the handles (A) on each side of the assembly and sliding it into the enclosure.



22.

Install the removable media unit

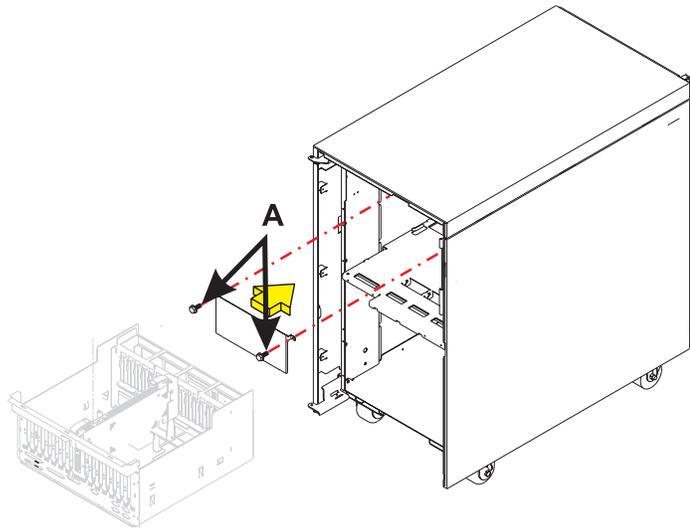
Install the removable media unit by pushing in on the handles (A) on each side of the unit and sliding it into the enclosure.



23.

Install the bulkhead cover

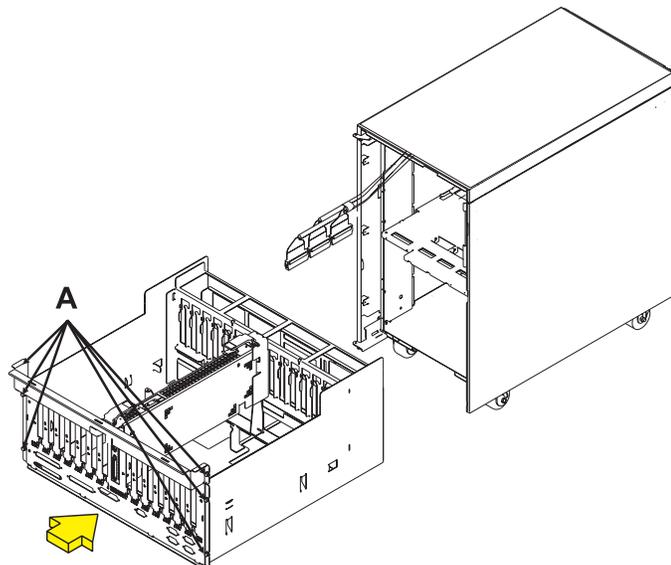
1. From the rear of the expansion tower, reach through the opening directly above the power distribution board (where the bulkhead cover was removed from) and reconnect the cables to the rear of the device board assembly (DB3).
2. Install the bulkhead cover.
3. Install the two screws (A) in the bulkhead cover.



24.

Install the PCI card cage assembly

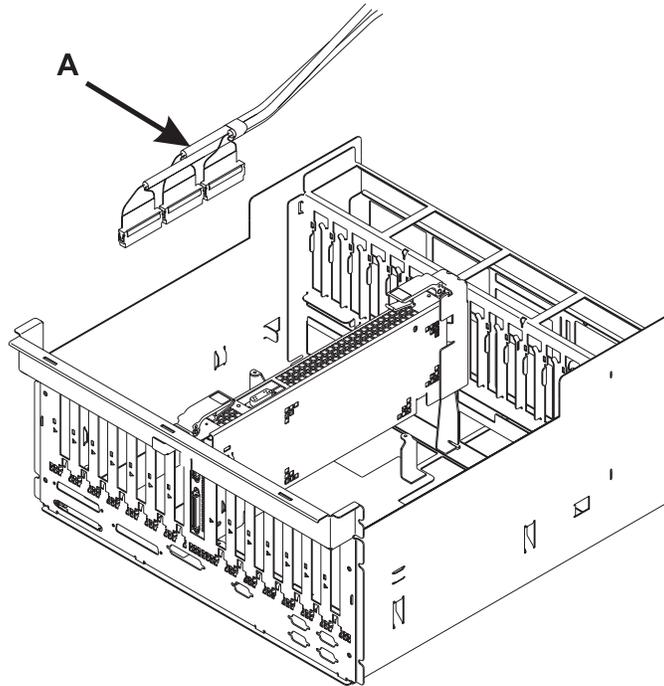
1. Carefully slide the PCI card cage assembly into the frame, while holding the cables away from the assembly.
2. Push the PCI card cage assembly into the frame so that the screw holes in the assembly line up with the screw holes in the frame.
3. Install the six screws (A).



25.

Install the PCI card cage assembly cables

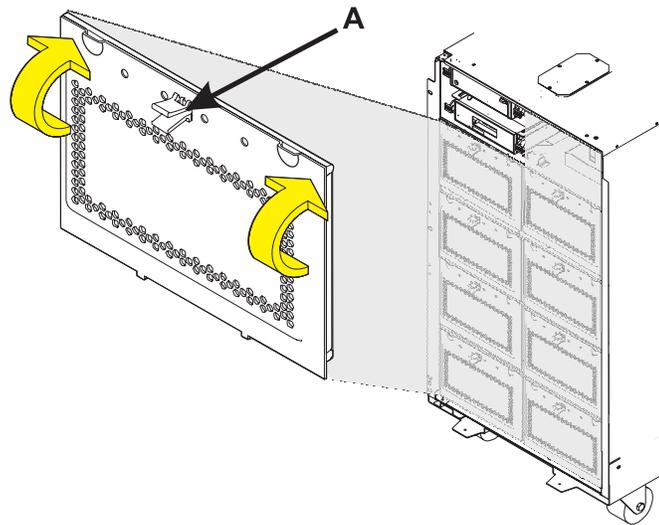
1. Connect all SCSI cables (A) to the top of the DASD controller cards.
2. Connect the external cables to the PCI cards.



26.

Install the EMC access plate in the disk unit enclosure

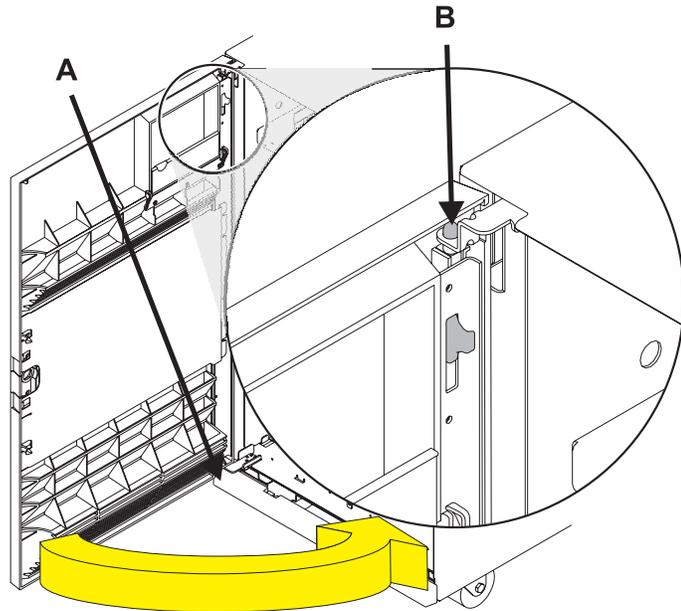
1. Align the two tabs in the EMC access plate with the two notches in the disk unit enclosure.
2. Push the top of the access plate towards the frame until the latching mechanism (A) engages.



27.

Install the front cover

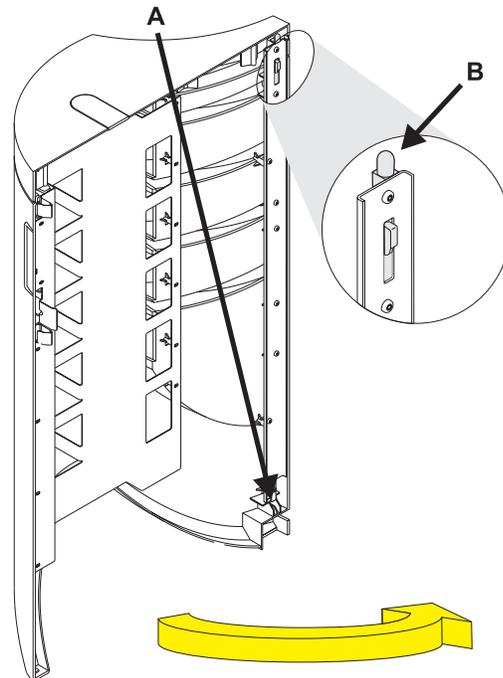
1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



28.

Install the rear cover

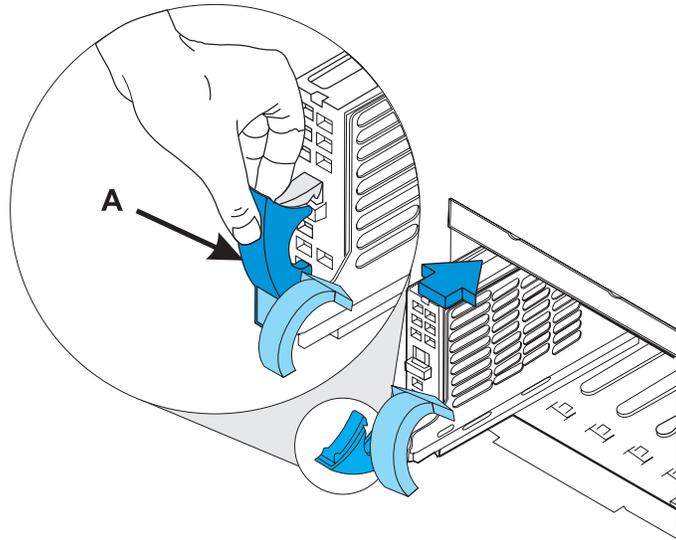
1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Disks units

Install the disk unit

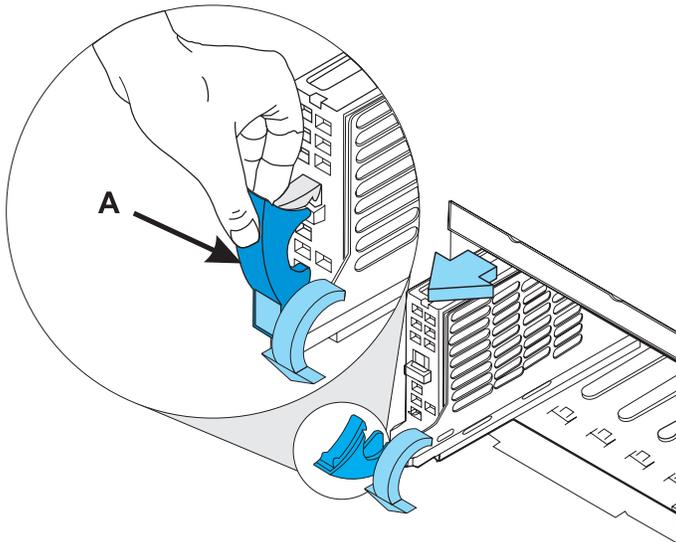
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle **(A)** down, then pushing the handle upward to lock it into place.



Remove disk unit

Remove the disk unit

1. Pinch the two surfaces of the latching mechanism together and pull the handle **(A)** towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



Display panel

1.

Use this procedure to service the Display Panel - NB1.

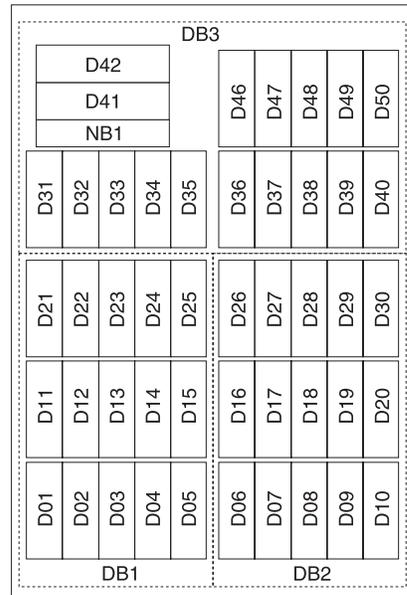
The Display Panel is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.

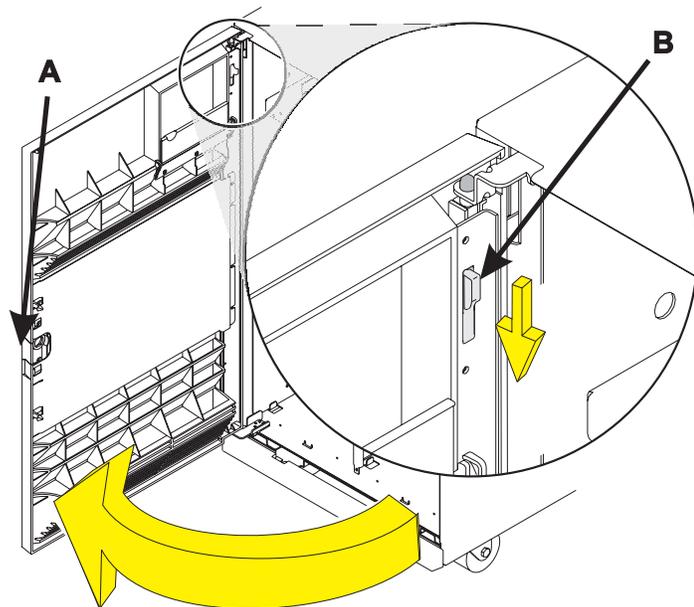


Front

2.

Remove the front cover

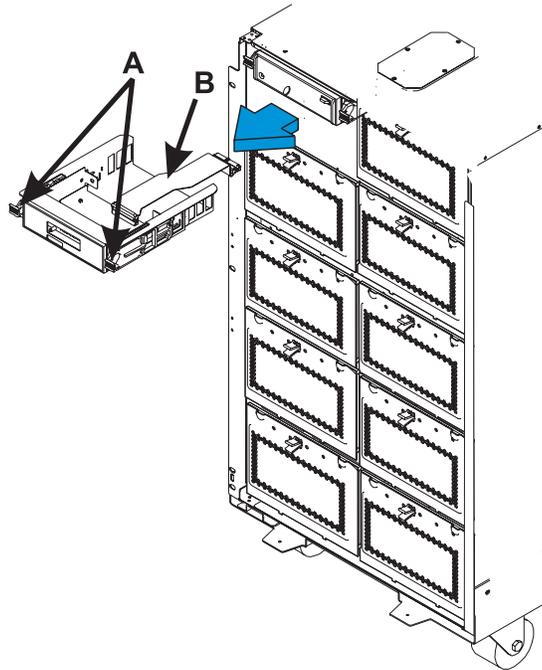
1. Unlock the cover.
2. Open the cover by grasping its right side (A) and pulling it towards you.
3. **Note:** The front cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
4. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
5. Tilt the top of the cover away from the tower, and lift the cover off.



3.

Remove the display panel

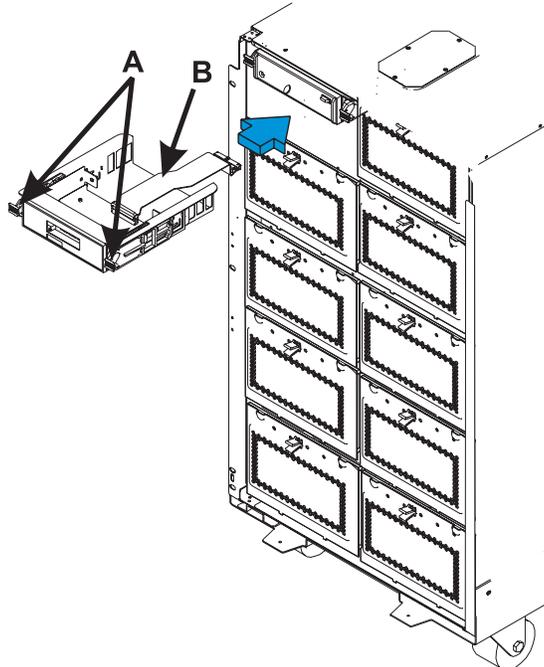
1. Remove the display panel by pulling out on the two side handles (A) and sliding the display panel partially out of the frame.
2. Disconnect the cable (B) that is attached to the rear of the display panel.
3. Remove the display panel from the frame.



4.

Install the display panel

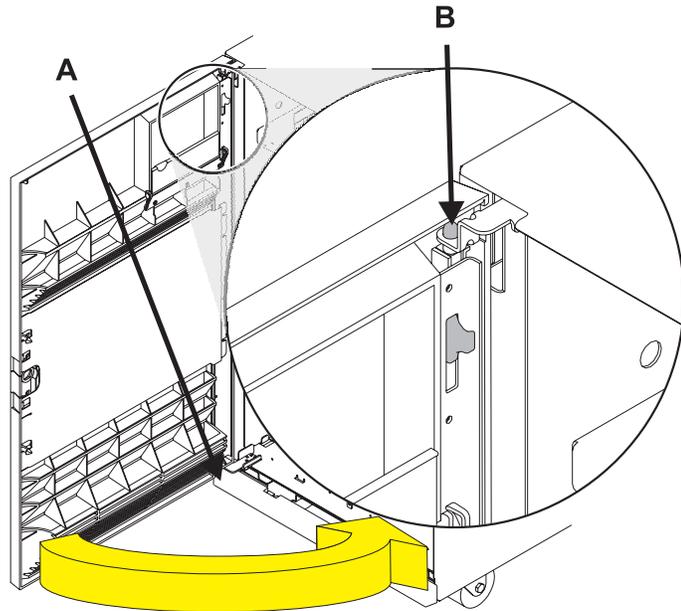
1. Slide the new display panel assembly partially into the frame by pushing in on the handles (A) on each side of the assembly.
2. Connect the end of the display panel cable (B) to the rear of the display panel.
3. Install the display panel by pushing in on the handles (A) on each side of the assembly and sliding it into the enclosure.



5.

Install the front cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.

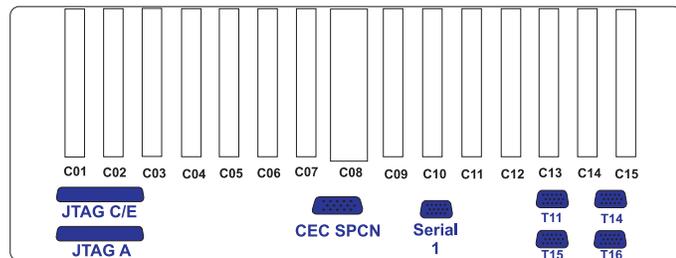


External cables

1.

Remove the External Cables

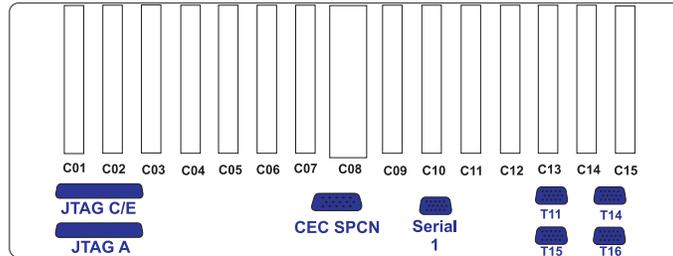
Use the graphic to locate the cable in location: and remove it.



2.

Install the External Cables

Use the graphic to locate the location: where the cable is to be installed and install it.

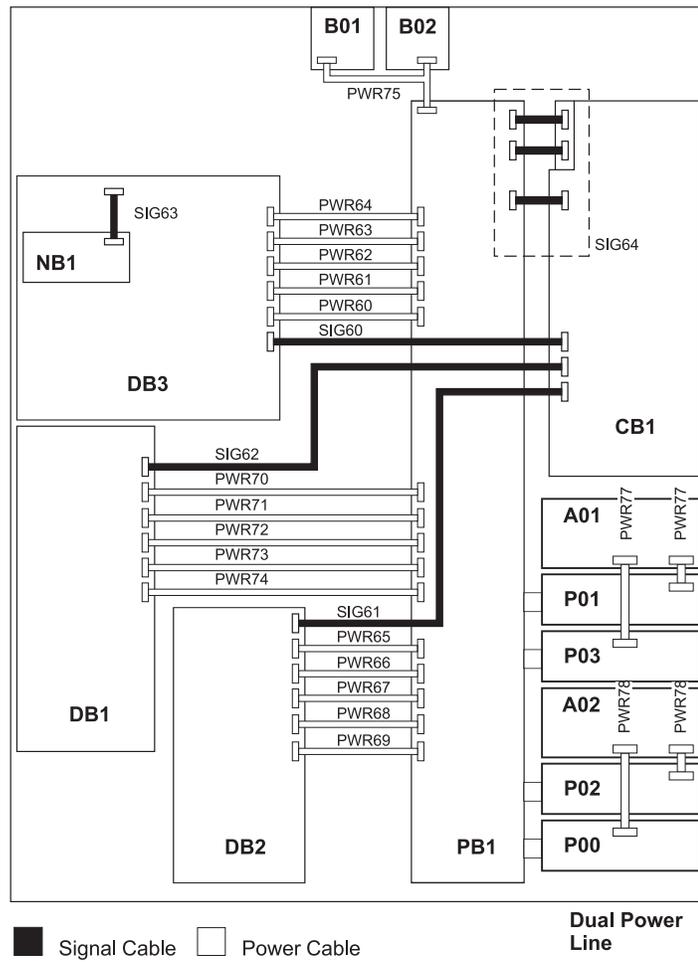


Internal cables

1.

Remove the Internal Cables

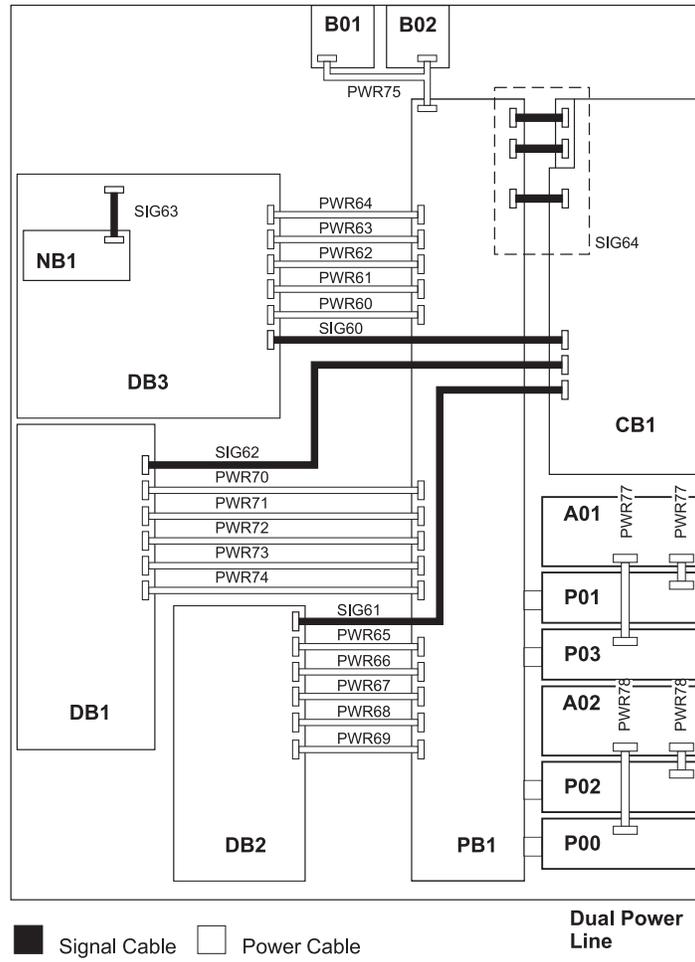
1. Remove the power cord.
2. Use the graphic to locate the cable in location: and remove it.



2.

Install the Internal Cables

1. Use the graphic to locate the location: where the cable is to be installed and install it.
2. Install the power cord.



NIC card

1.

Use this procedure to service the HSL/RIO Adapter Card.

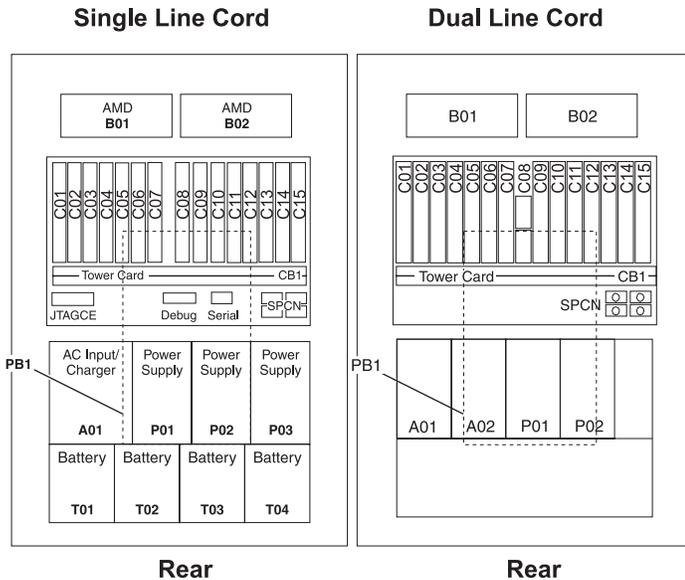
The HSL/RIO Adapter Card is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



2.

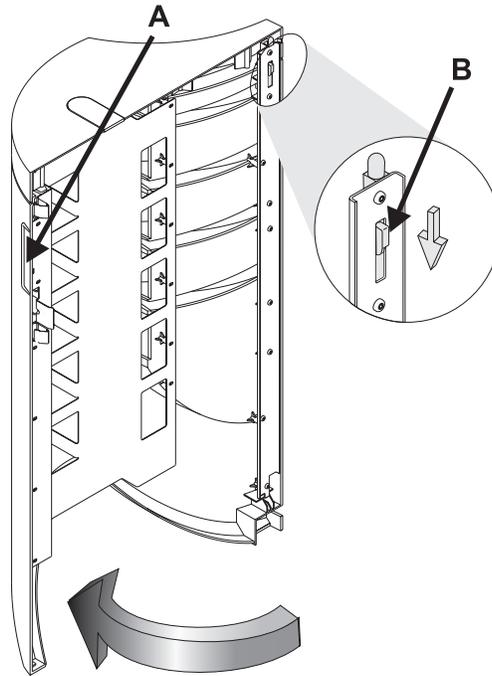
The system contains circuit cards and/or assemblies that contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)

Attention: All cards are sensitive to electrostatic discharge.

3.

Remove the rear cover

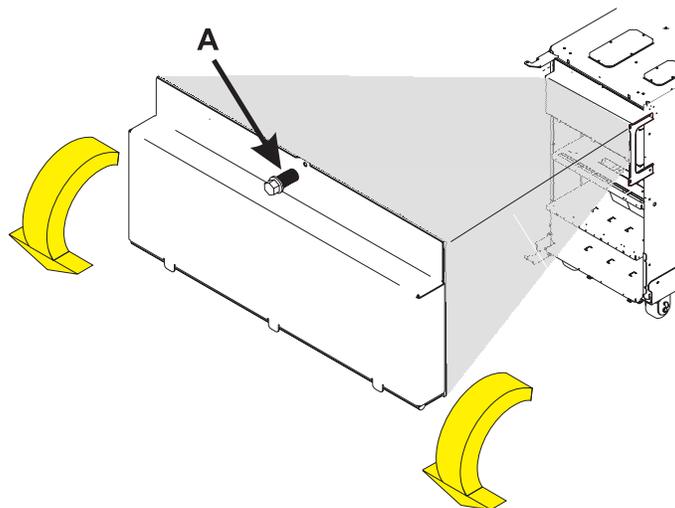
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



4.

Remove the EMC access plate above the PCI card cage assembly

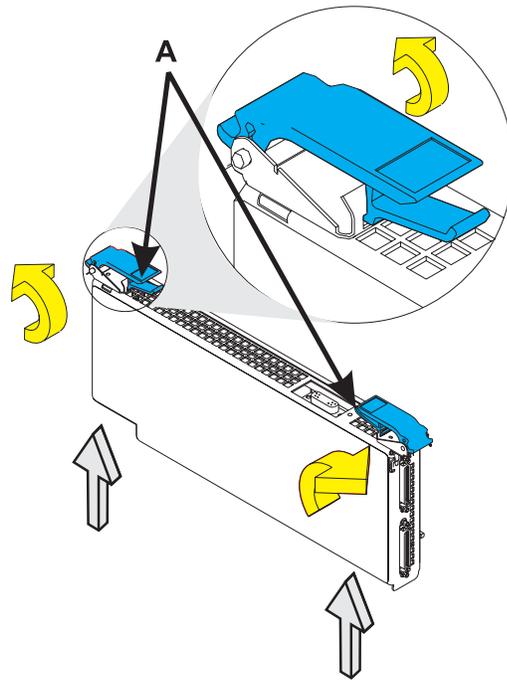
1. Remove one screw (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.



5.

Remove the HSL/RIO Adapter Card

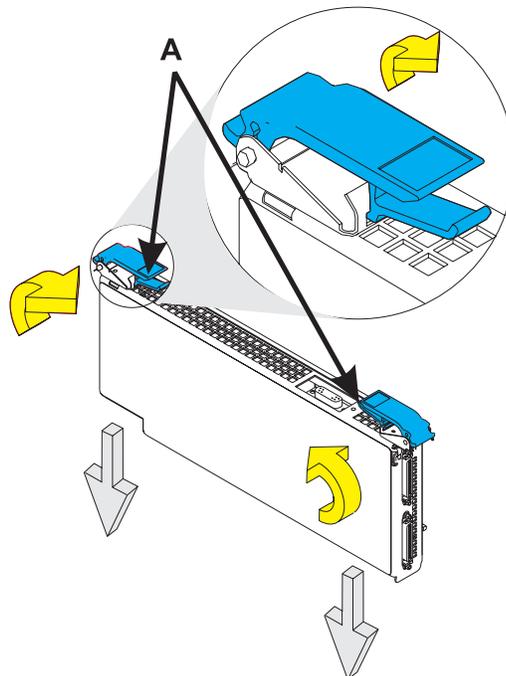
1. Push down on the blue latches (A) for the card you wish to remove.
2. Gently pull the card straight out of the card cage assembly.



6.

Install the HSL/RIO Adapter Card

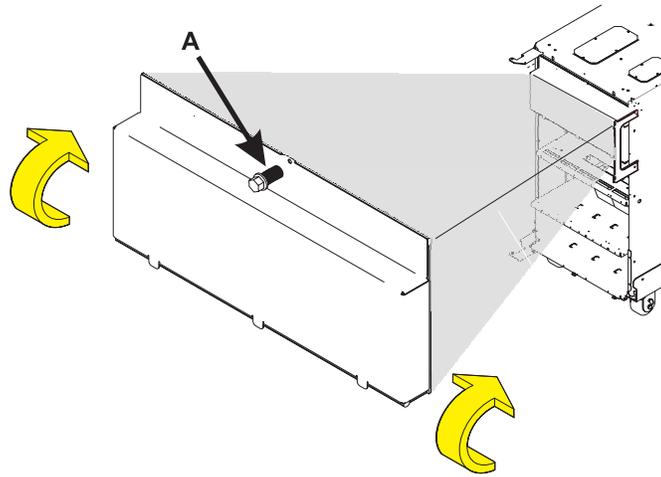
1. Push the card straight into its slot in the card cage assembly.
2. Pull up on the blue latches (A) for the card you are installing.



7.

Install the EMC access plate above the PCI card cage assembly

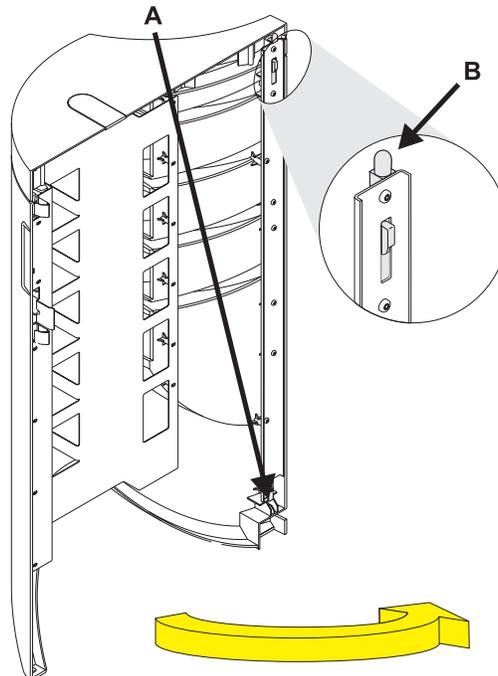
1. Align the three tabs in the EMC access plate with the three notches in the frame.
2. Install one screw (A) in the EMC access plate.



8.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



PCI card

1.

Use this procedure to service a PCI card.

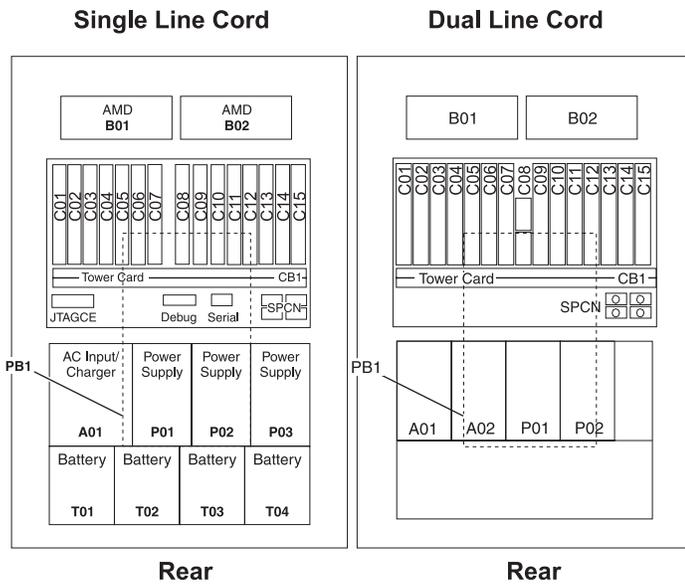
The PCI card is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



2.

Use this procedure to service a PCI card.

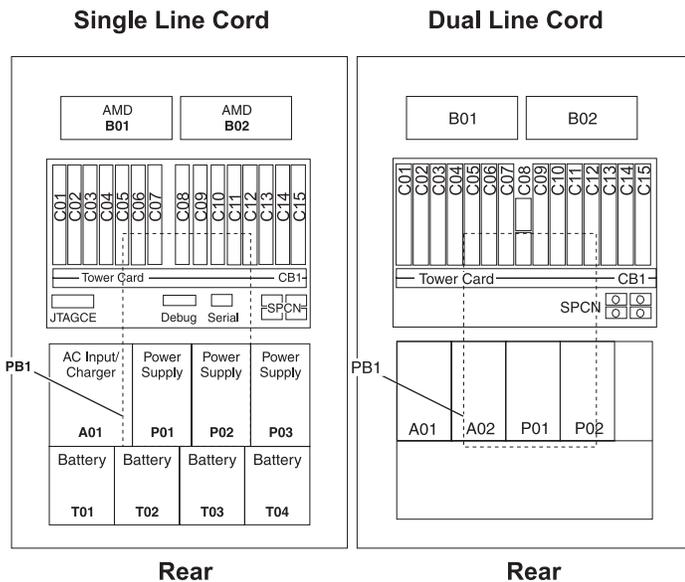
The PCI card is in location:

Machine Type:

Model:

Serial Number:

The component will be serviced concurrently. Power should not be removed from the unit containing the FRU in the location field above. Do not remove power to the unit during this repair procedure.



3.

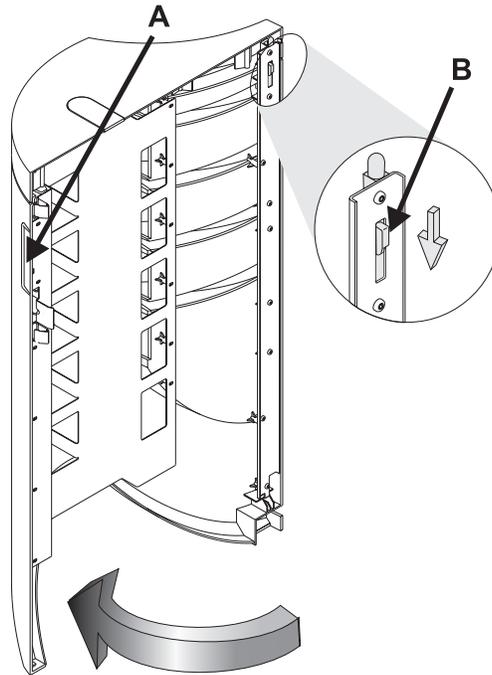
The system contains circuit cards and/or assemblies that contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)

Attention: All cards are sensitive to electrostatic discharge.

4.

Remove the rear cover

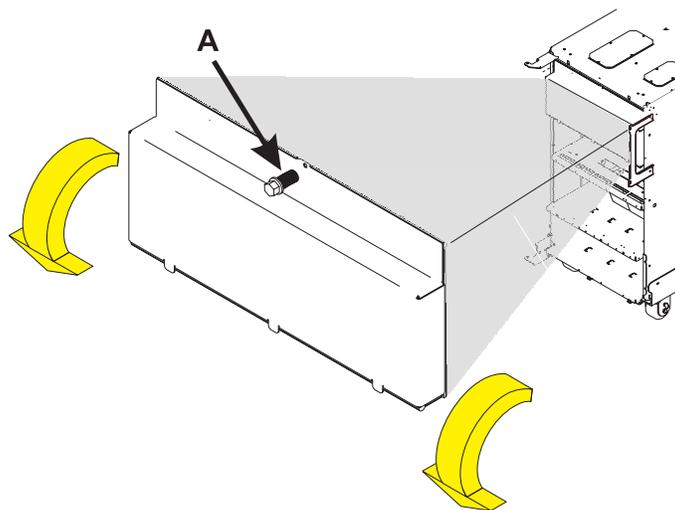
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



5.

Remove the EMC access plate above the PCI card cage assembly

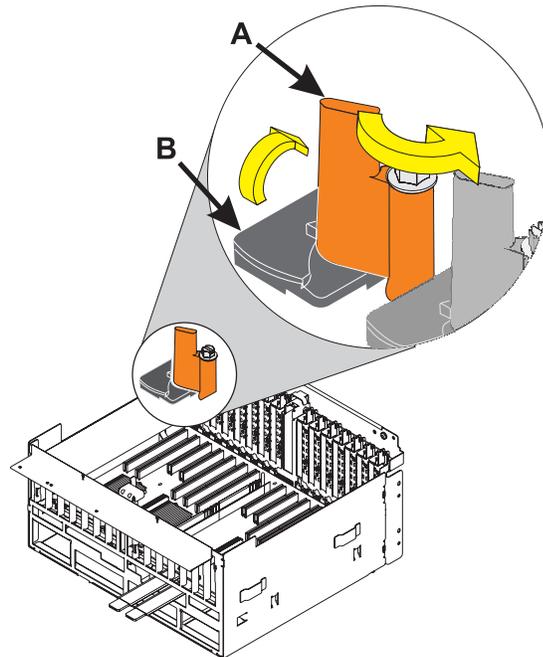
1. Remove one screw (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.



6.

Remove the PCI card

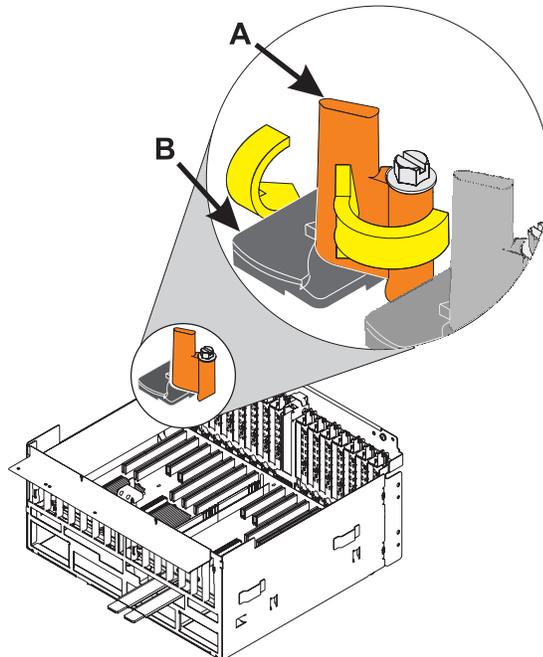
1. Look at the power LED for the card that you are removing to ensure that it is powered off. The power LED is located to the left of and directly above the card slot. If the LED is flashing or it is off, then the card is powered off.
2. Disconnect and label any cables from the card that you wish to remove.
3. Turn the orange latch **(A)** counter-clockwise and lift up on the black latch **(B)** to release the card.
4. Gently pull the card straight out of the card cage assembly.



7.

Install the PCI card

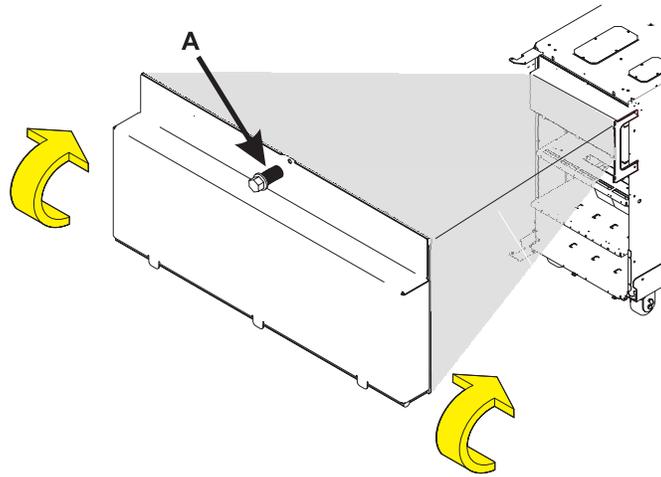
1. Push the card straight into its slot in the PCI card cage assembly.
2. Push down on the black latch **(B)** then turn the orange latch **(A)** clockwise to secure the card.
3. Connect any cables to the card that you previously removed.



8.

Install the EMC access plate above the PCI card cage assembly

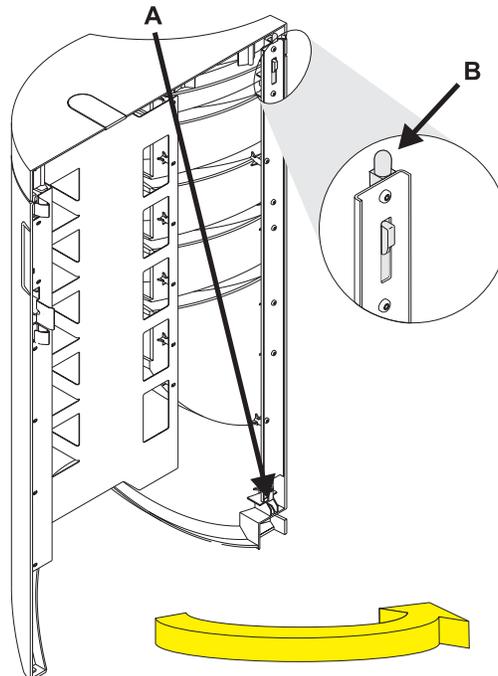
1. Align the three tabs in the EMC access plate with the three notches in the frame.
2. Install one screw (A) in the EMC access plate.



9.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Power distribution board

1.

Use this procedure to service the Power Distribution Board - PB1.

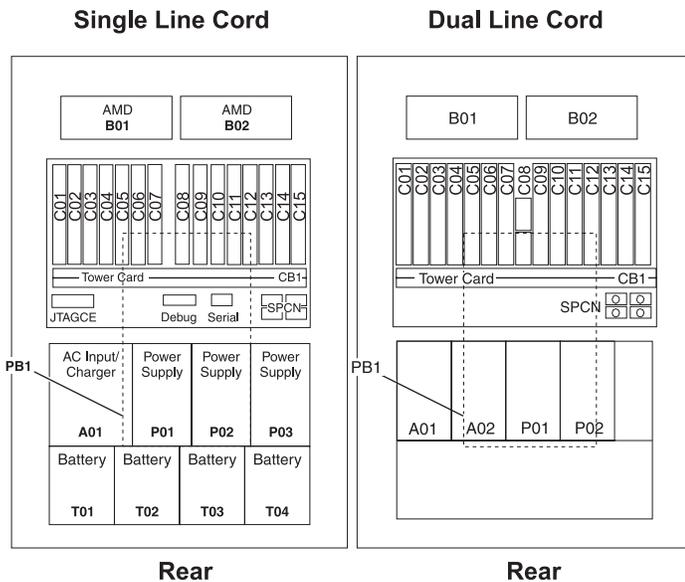
The Power Distribution Board is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.

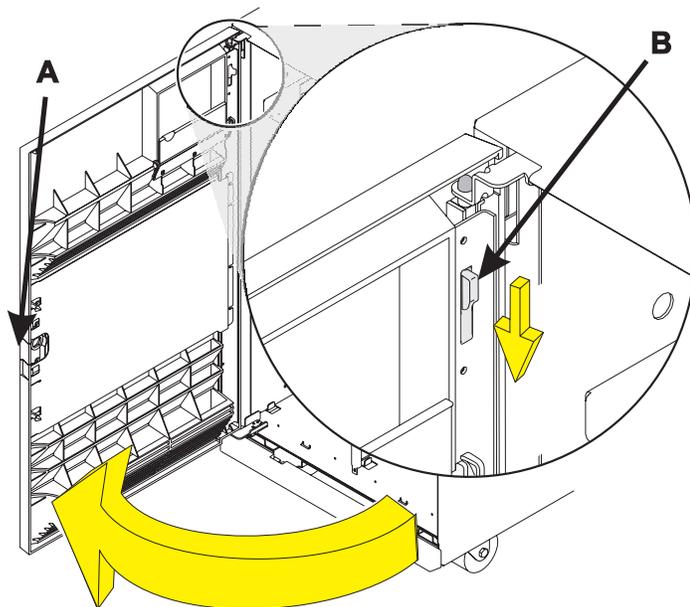


2.

Remove the front cover

1. Unlock the cover.
2. Open the cover by grasping its right side (A) and pulling it towards you.
3.

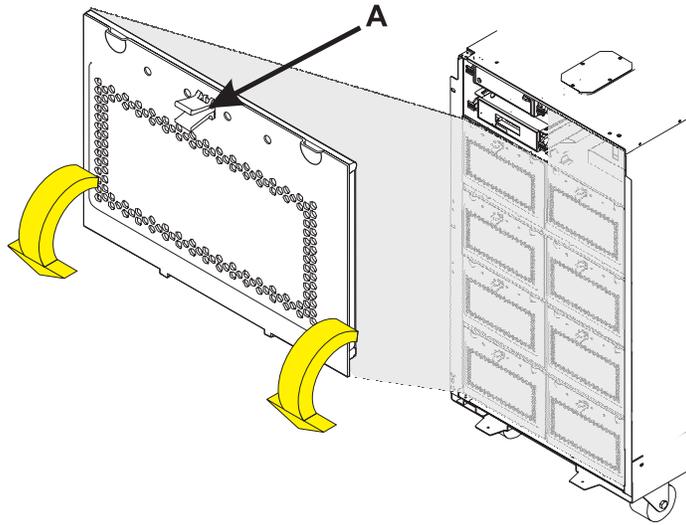
Note: The front cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
4. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
5. Tilt the top of the cover away from the tower, and lift the cover off.



3.

Remove the EMC access plate from the disk unit enclosure

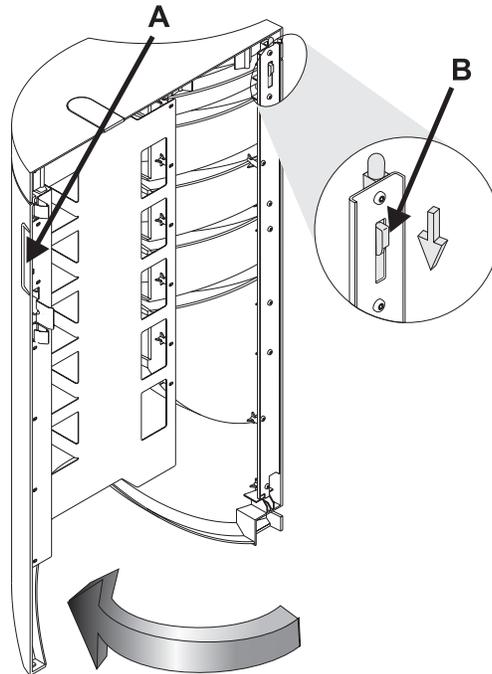
Press the latching mechanism (A) together and tilt the top of the access plate away from the frame to remove it.



4.

Remove the rear cover

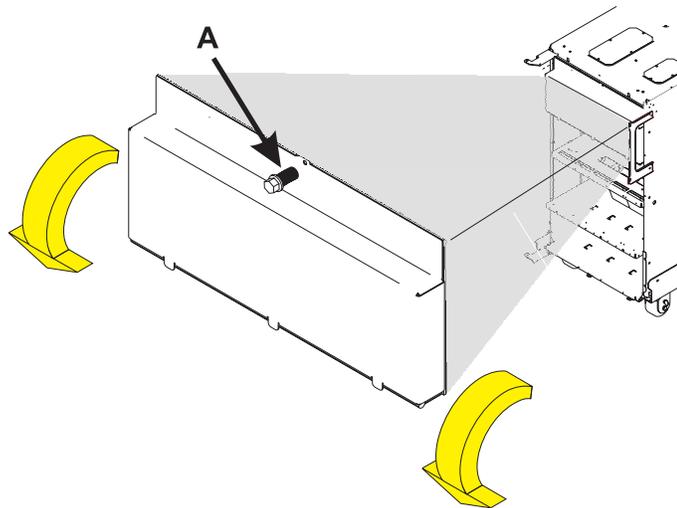
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



5.

Remove the EMC access plate above the PCI card cage assembly

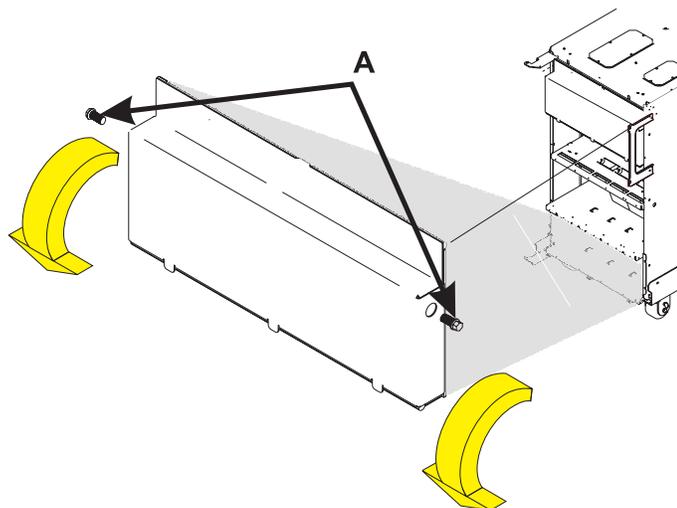
1. Remove one screw (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.



6.

Remove the EMC access plate from the battery enclosure

1. Remove two screws (A) from the EMC access plate.
2. Tilt the top of the access plate away from the frame to remove it.

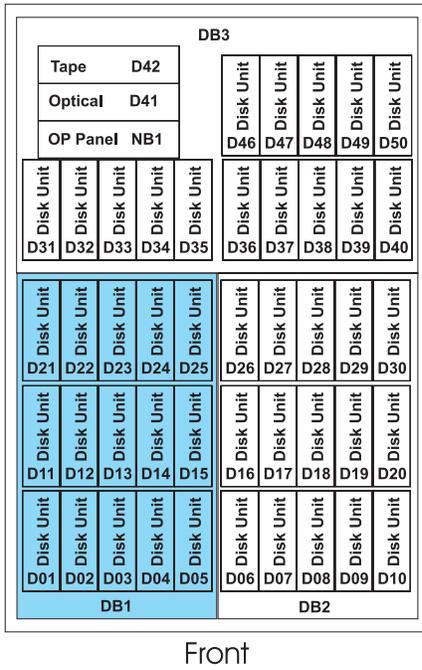


7.

Record the disk unit locations

1. Record the locations of the disk units that are currently installed in the DB1 device board.
2. Label each disk unit in the DB1 device board with the appropriate location. Valid disk unit locations for DB1 include D01, D02, D03, D04, D05, D11, D12, D13, D14, D15, D21, D22, D23, D24, and D25.

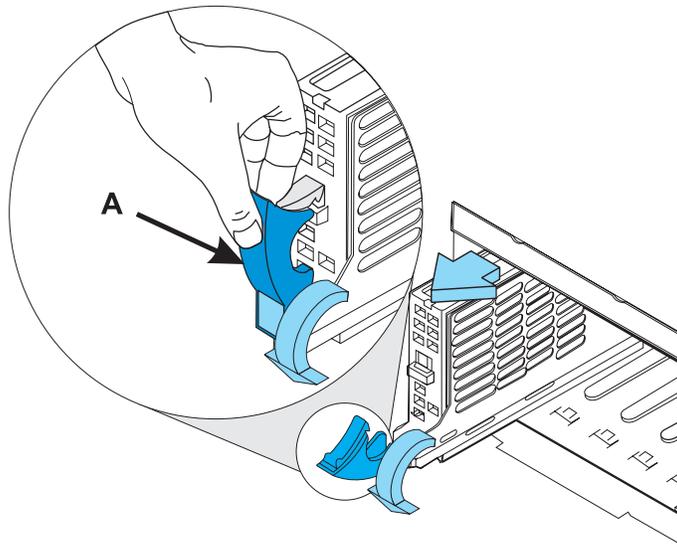
Note: Use the following disk unit removal procedures to remove all the disk units in the DB1 deviceboard.



8.

Remove the disk unit

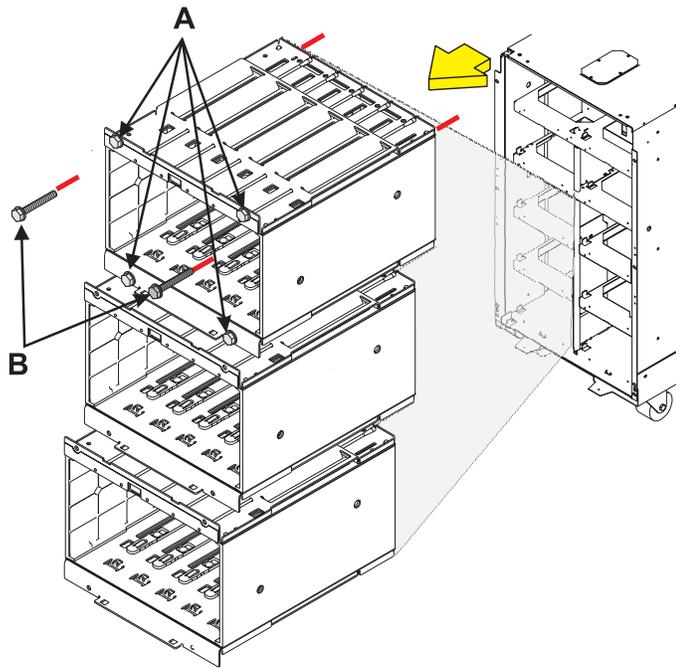
1. Pinch the two surfaces of the latching mechanism together and pull the handle (A) towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



9.

Remove the disk unit enclosures

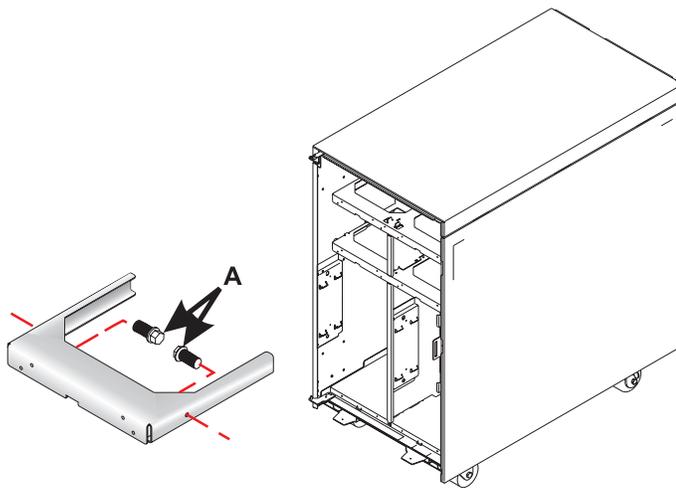
1. Remove the four screws (A) that hold the disk unit enclosure to the frame.
2. Remove the two long retaining screws (B) that are located inside of the disk unit enclosure (the top right and bottom left corners).
3. Remove the disk unit enclosures covering the DB1 board by sliding them straight out of the frame.



10.

Remove the device board shelf

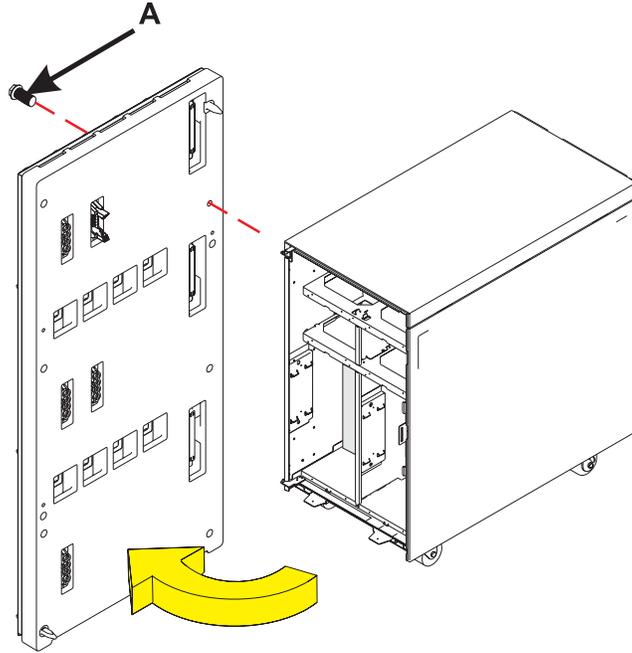
1. Remove the two screws (A) that hold each device board shelf to the frame.
2. Remove the two device board shelves from the frame that are covering DB1.



11.

Remove the device board assembly

1. Remove the retaining screw (A) that is holding the device board assembly to the frame.
2. Pull the device board assembly out until it slides off the guide pins, then rotate the device board assembly 90 degrees.
3. Label and disconnect all cables from the rear of the DB1 device board assembly.
4. Remove the DB1 device board assembly by pulling it straight out of the frame.



12.

Record the disk unit locations

1. Record the locations of the disk units that are currently installed in the DB2 device board.
2. Label each disk unit in the DB2 device board with the appropriate location. Valid disk unit locations for DB2 include D06, D07, D08, D09, D10, D16, D17, D18, D19, D20, D26, D27, D28, D29, and D30.

Note: Use the following disk unit removal procedures to remove all the disk units in the DB2 deviceboard.

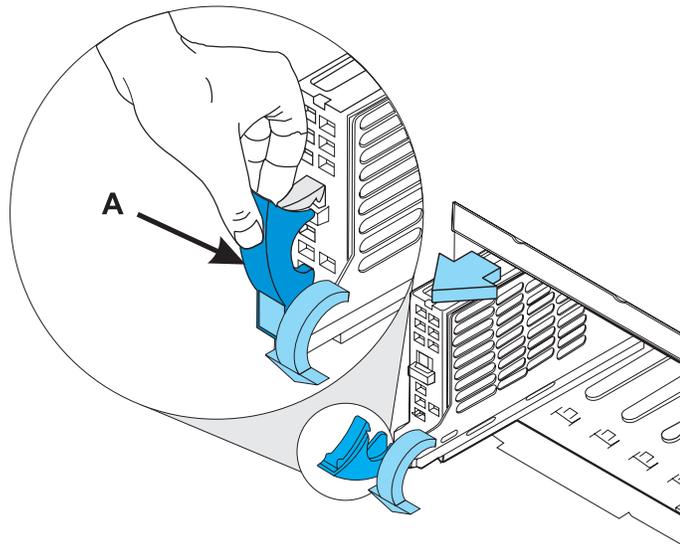
DB3									
Tape D42					Disk Unit				
Optical D41					Disk Unit				
OP Panel NB1					Disk Unit				
					D46 D47 D48 D49 D50				
Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit
D31	D32	D33	D34	D35	D36	D37	D38	D39	D40
Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit
D21	D22	D23	D24	D25	D26	D27	D28	D29	D30
Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit
D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit	Disk Unit
D01	D02	D03	D04	D05	D06	D07	D08	D09	D10
DB1					DB2				

Front

13.

Remove the disk unit

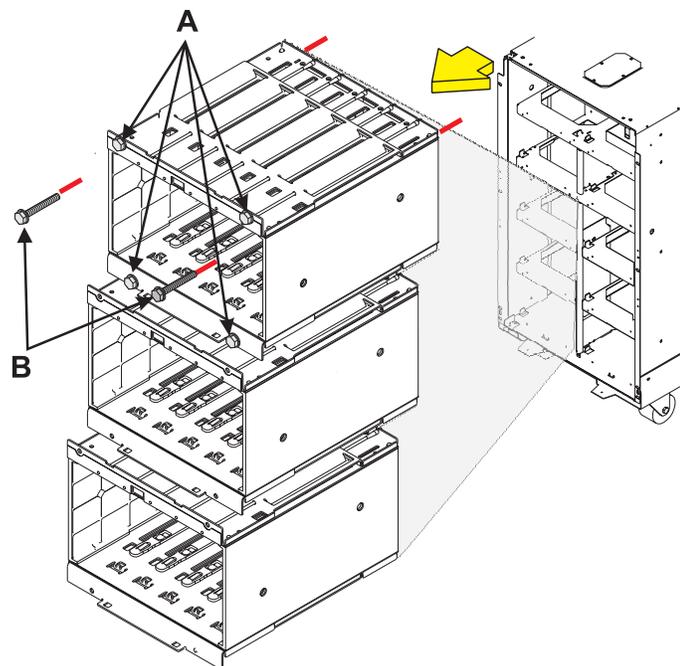
1. Pinch the two surfaces of the latching mechanism together and pull the handle **(A)** towards you to release the disk unit from the slot.
2. Remove the disk unit from the tower by sliding it straight out of the enclosure.



14.

Remove the disk unit enclosures

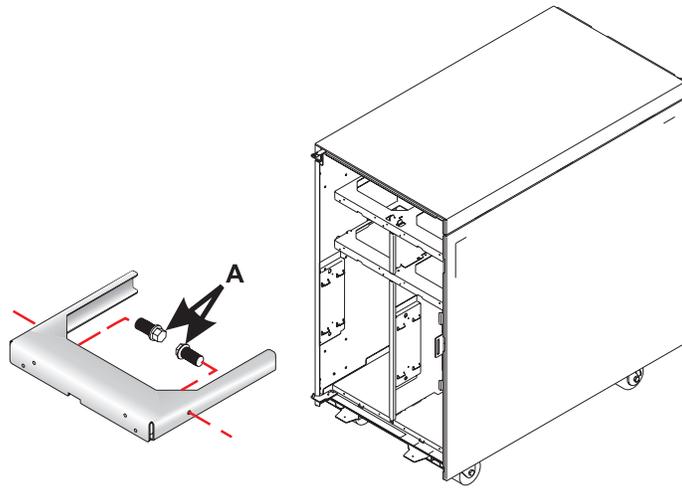
1. Remove the four screws **(A)** that hold the disk unit enclosure to the frame.
2. Remove the two long retaining screws **(B)** that are located inside of the disk unit enclosure (the top right and bottom left corners).
3. Remove the disk unit enclosures covering the DB2 board by sliding them straight out of the frame.



15.

Remove the device board shelf

1. Remove the two screws (A) that hold each device board shelf to the frame.
2. Remove the two device board shelves from the frame that are covering DB2.



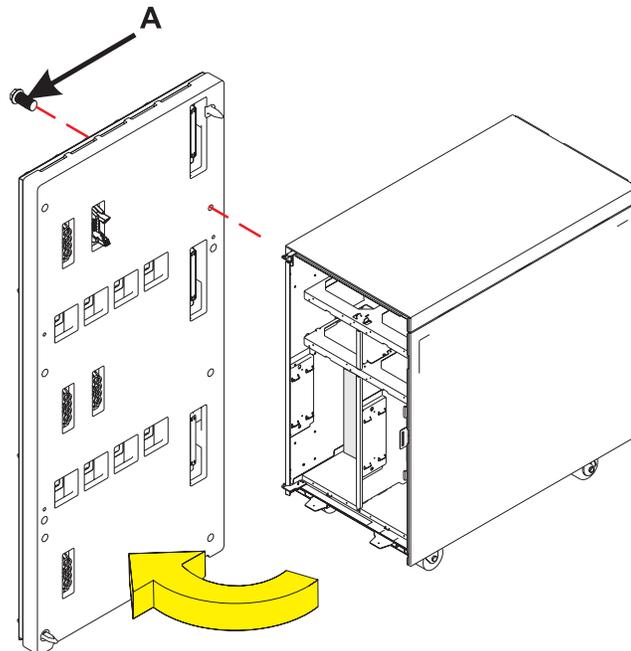
16.

Remove the device board assembly

1. Remove the retaining screw (A) that is holding the device board assembly to the frame.
2. Pull the device board assembly out until it slides off the guide pins, then rotate the device board assembly 90 degrees.

Note: The video being displayed for this step shows the DB1 device board, but the motion of rotating the board is identical to DB2.

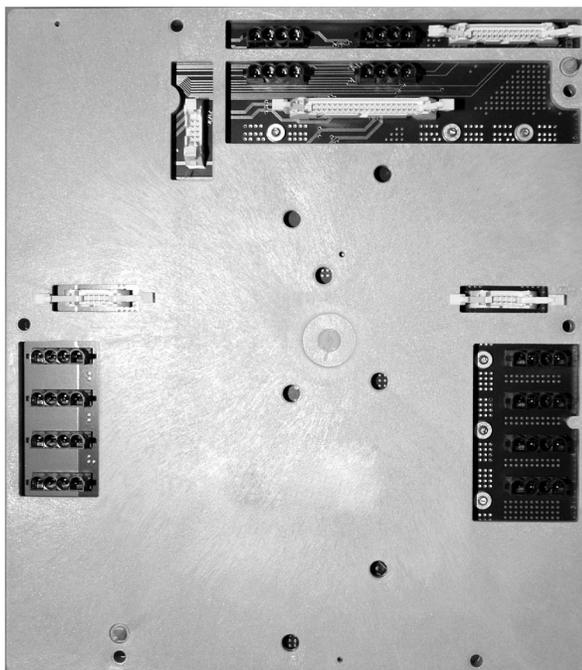
3. Label and disconnect all cables from the rear of the DB2 device board assembly.
4. Remove the DB2 device board assembly by pulling it straight out of the frame.



17.

Disconnect the power distribution board cables

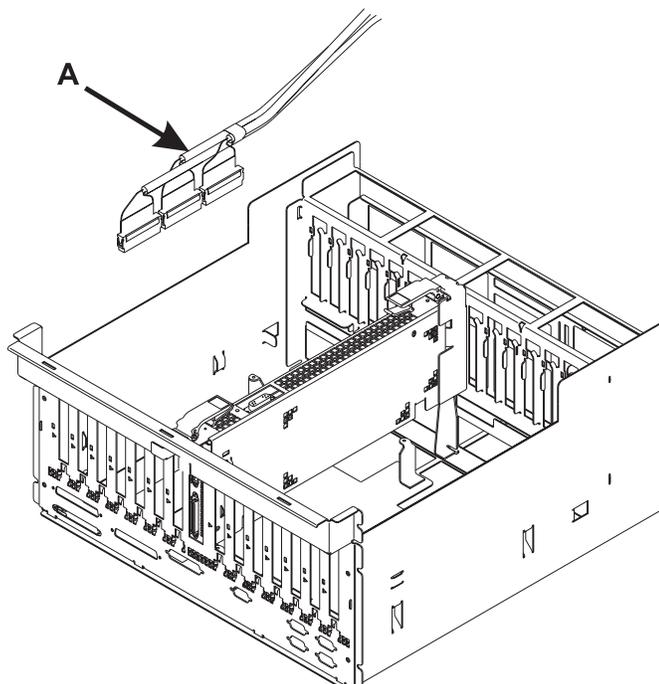
1. Label and disconnect the cables from the rear of the power distribution board on the left side of the frame (directly behind where the DB1 board was removed from).
2. Label and disconnect the cables from the rear of the power distribution board on the right side of the frame (directly behind where the DB2 board was removed from).
3. Label and disconnect the cables from the rear of the power distribution board at the top of the board. **Note:** These cables are not easily visible. You will need to reach slightly below the DB3 board to disconnect them.



18.

Remove the PCI card cage assembly cables

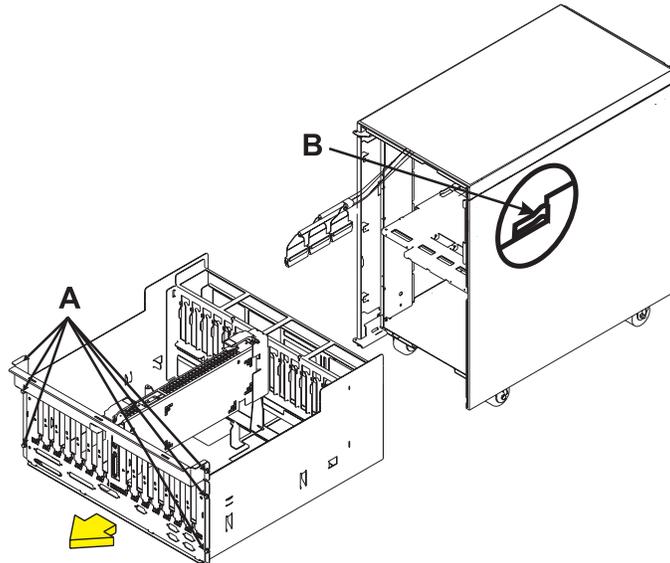
1. Label (if necessary) and disconnect the SCSI cables (A) from the top of the DASD controller cards.
2. Label (if necessary) and disconnect the external cables from the PCI cards.



19.

Remove the PCI card cage assembly

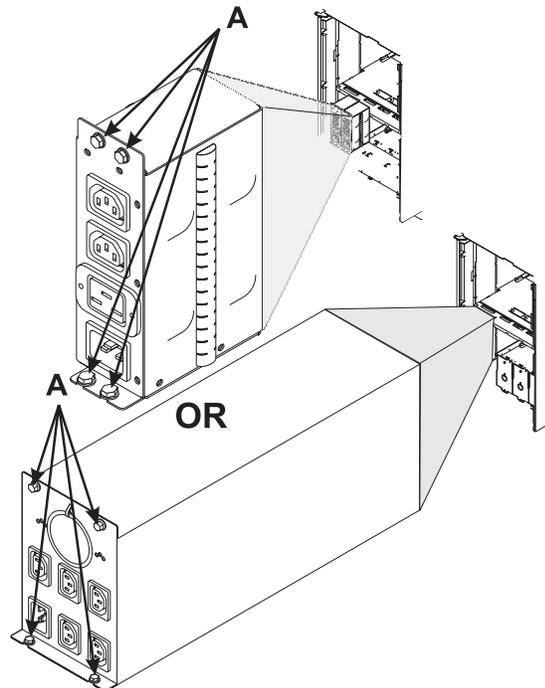
1. Remove the six screws (A).
2. Pull the PCI card cage assembly partially out of the frame while holding the cables away from the assembly.
3. Press the release mechanism (B) and carefully slide the assembly out of the frame.



20.

Remove the AC Charger/AC Module

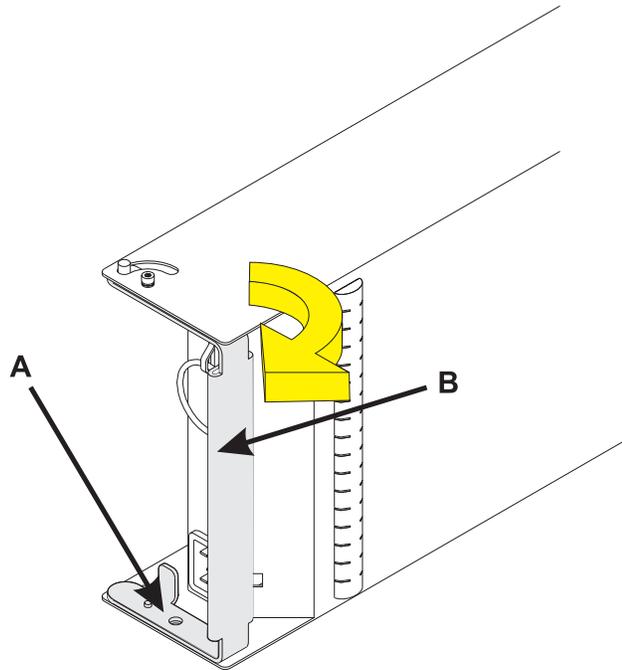
1. Disconnect the AC input line cord from the AC charger/module that needs replacing.
2. Disconnect the power supply jumper cords from the AC charger/module that you are working on.
3. Remove the four screws (A) that hold the AC charger/module to the frame.
4. Remove the AC charger/module from the frame by pulling on the ring (B) (if present) with one hand, then supporting the bottom of the AC charger/module with your other hand.



21.

Remove the power supply

1. Disconnect the power jumper cord from the unit that you are replacing.
2. **DANGER: Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source.**
3. Remove the bottom screw (A) (if installed).
4. Rotate the handle (B) in the direction shown to release the power supply from the frame.
5. Remove the power supply by pulling the handle (B) straight out from the frame.



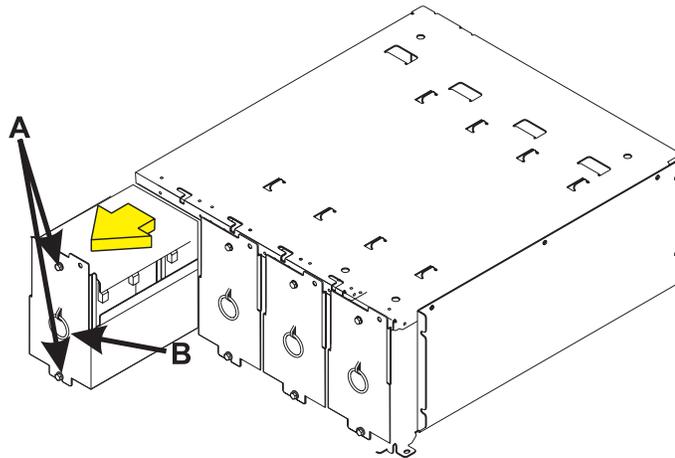
22.

Remove the battery power unit

1. Remove the two screws (A) from the battery unit.
2. Remove the battery power unit by pulling on the ring (B) with one hand, then supporting the bottom of the battery unit with your other hand.

CAUTION: Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn.

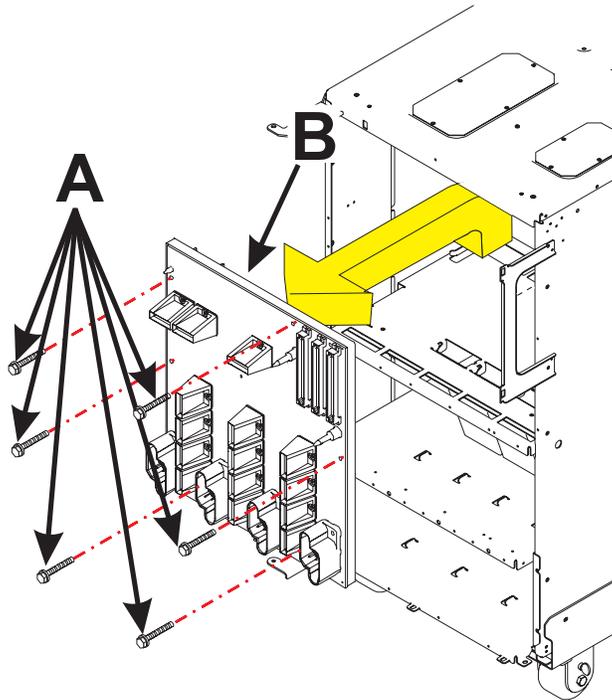
In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)



23.

Remove the power distribution board

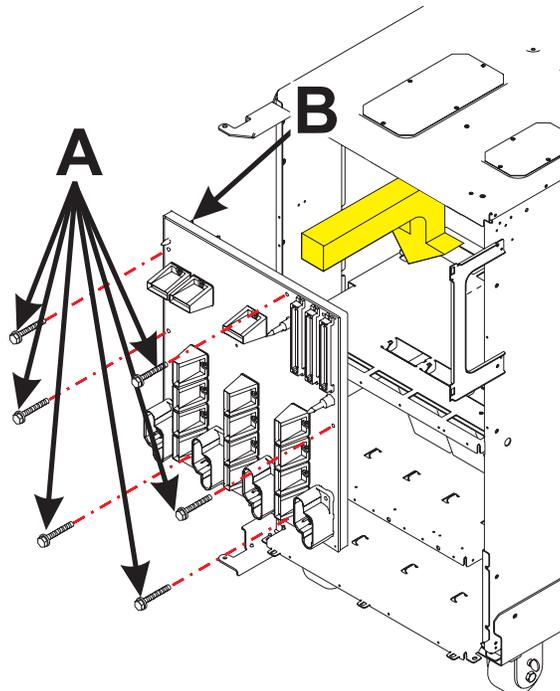
1. From the rear of the tower, remove the six mounting screws (A) that hold the power distribution board (B) to the frame. **Note:** While removing the screws, you may have to push the three metal retractable fillers up (located where the power supplies were removed from).
2. Pull the power distribution board slightly towards you and lift it up to remove it from the frame.



24.

Install the power distribution board

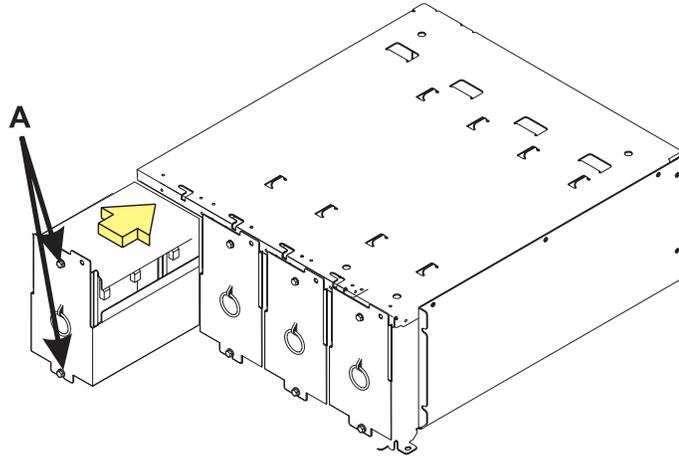
1. Lower and insert the power distribution board (B) into the frame.
2. Install the six mounting screws (A) that hold the power distribution board to the frame. **Note:** While installing the screws, you may have to push the three metal retractable fillers up (located where the power supplies were removed from).



25.

Install the battery power unit

1. Install the battery power unit by sliding it all the way into its slot with both hands.
CAUTION: Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)
2. Install the two screws (A) in the battery unit.



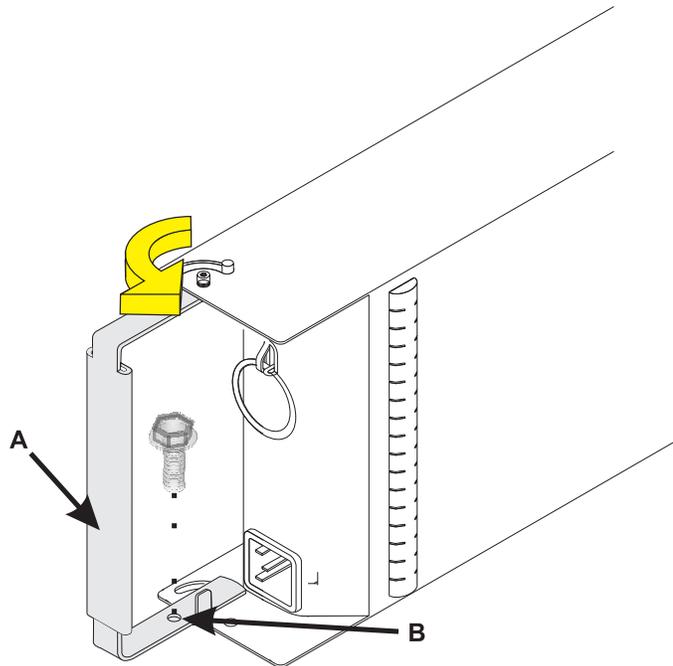
26.

Install the power supply

Note: Do not slam the power supply in when installing it into the system.

1. Carefully insert the power supply until it is engaged in the frame.
2. Rotate the handle (A) in the direction shown to secure the power supply in the frame.
3. Install the bottom screw (B) (if previously removed).
4. Connect the power jumper cord to the unit that you are replacing.
- 5.

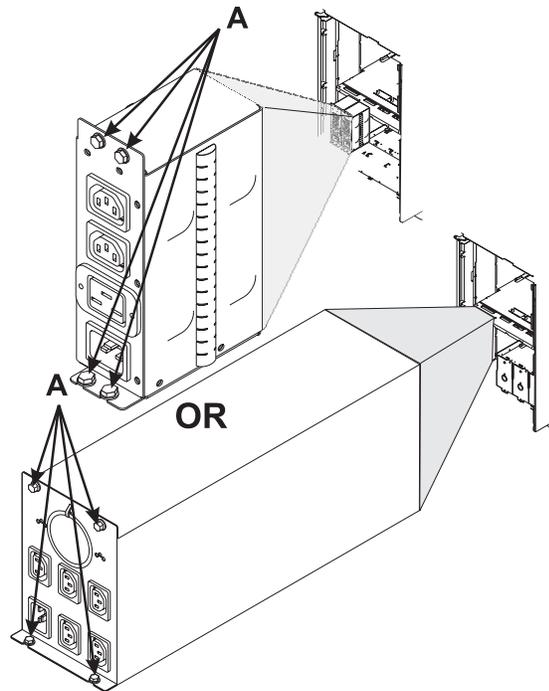
DANGER: Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source.



27.

Install the AC Charger/AC Module

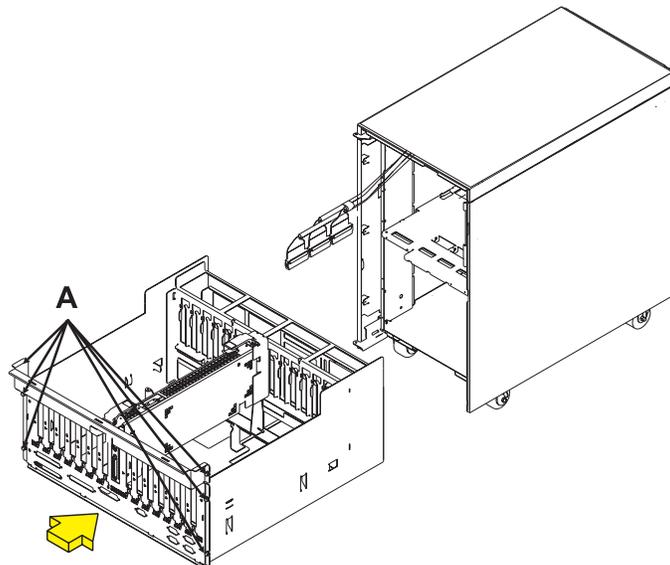
1. Install the AC charger/module in the frame.
2. Install the four screws (A) that hold the AC charger/module to the frame.
3. Connect the power supply jumper cords to the AC charger/module.
4. Connect the ac line cord to the AC charger/module.



28.

Install the PCI card cage assembly

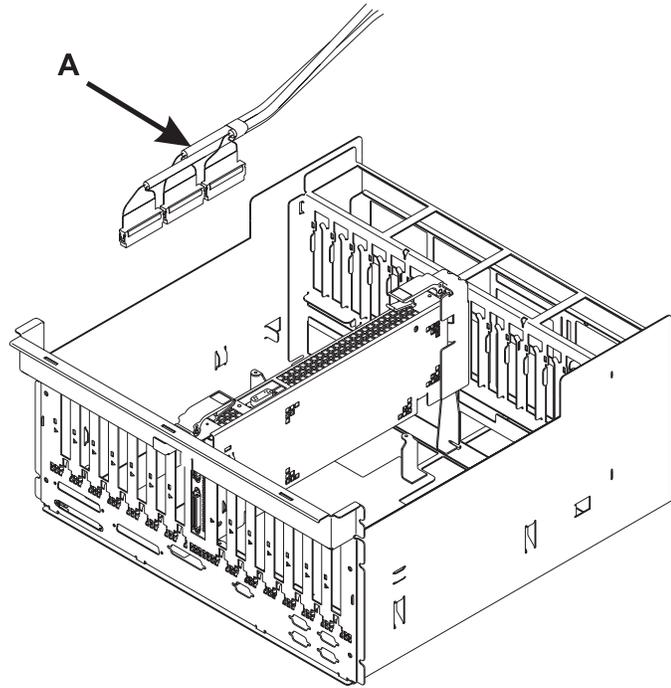
1. Carefully slide the PCI card cage assembly into the frame, while holding the cables away from the assembly.
2. Push the PCI card cage assembly into the frame so that the screw holes in the assembly line up with the screw holes in the frame.
3. Install the six screws (A).



29.

Install the PCI card cage assembly cables

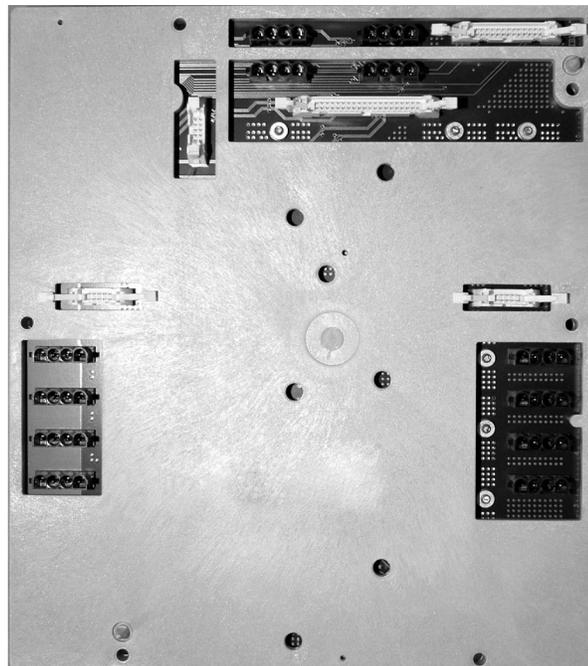
1. Connect all SCSI cables (A) to the top of the DASD controller cards.
2. Connect the external cables to the PCI cards.



30.

Connect the power distribution board cables

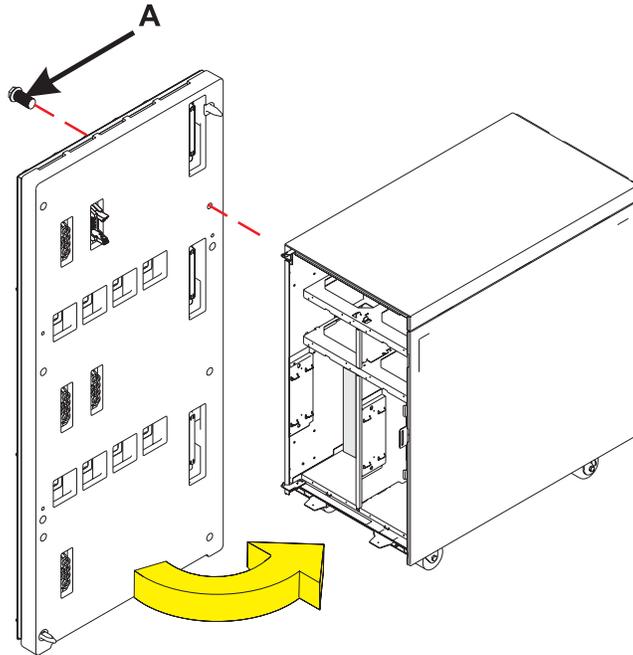
1. Connect the power distribution board cables into the rear of the power distribution board at the top of the board. **Note:** The connectors for these cables are not easily visible. You will need to reach slightly below the DB3 board to connect them.
2. Connect the power distribution board cables into the rear of the power distribution board on the right side of the frame (directly behind where the DB2 board was removed from).
3. Connect the power distribution board cables into the rear of the power distribution board on the left side of the frame (directly behind where the DB1 board was removed from).



31.

Install the device board assembly

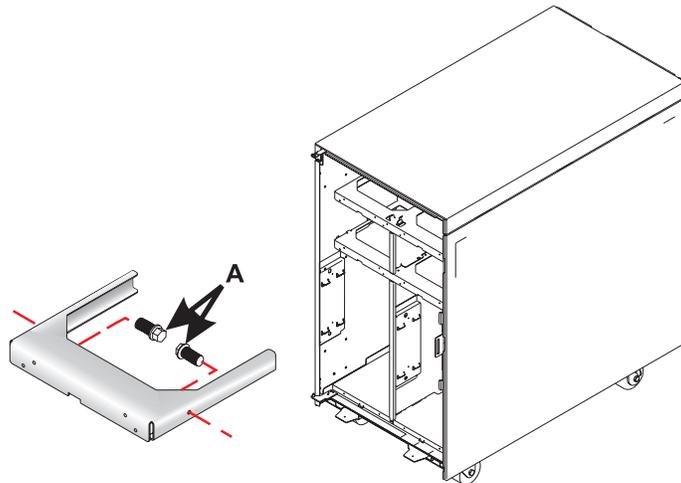
1. Install the DB2 device board assembly into the frame.
2. Connect the cables that were previously removed to the rear of the DB2 device board assembly.
3. Rotate the device board assembly 90 degrees, then push the device board assembly towards the frame until it slides onto the guide pins.
4. Install the retaining screw (A) that holds the DB2 device board assembly to the frame.



32.

Install the device board shelf

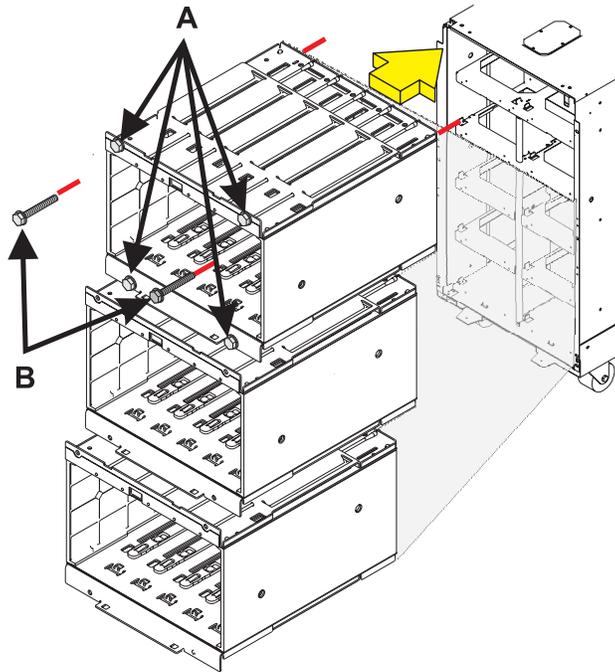
1. Install the two device board shelves that cover DB2 in the frame.
2. Install the two screws (A) that hold each device board shelf to the frame.



33.

Install the disk unit enclosures

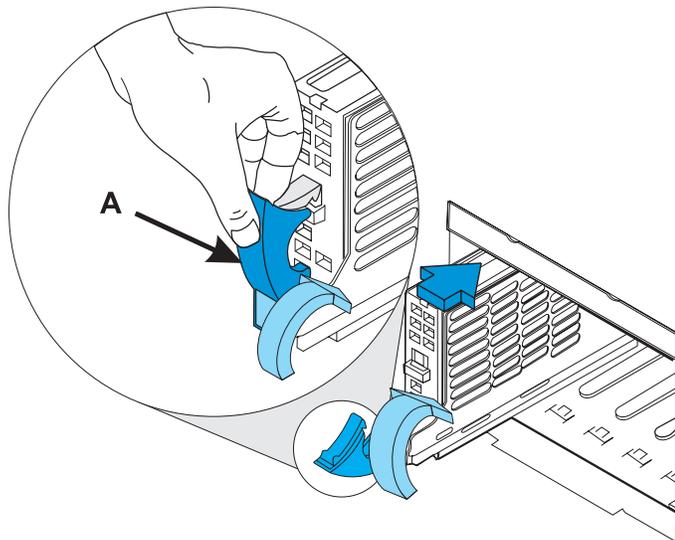
1. Install the disk unit enclosures, making sure to line up the guide pins when sliding the enclosures in.
2. Install the two long retaining screws (**B**) inside of the disk unit enclosure (the top right and bottom left corners).
3. Install the four screws (**A**) that hold the disk unit enclosure to the frame.



34.

Install the disk unit

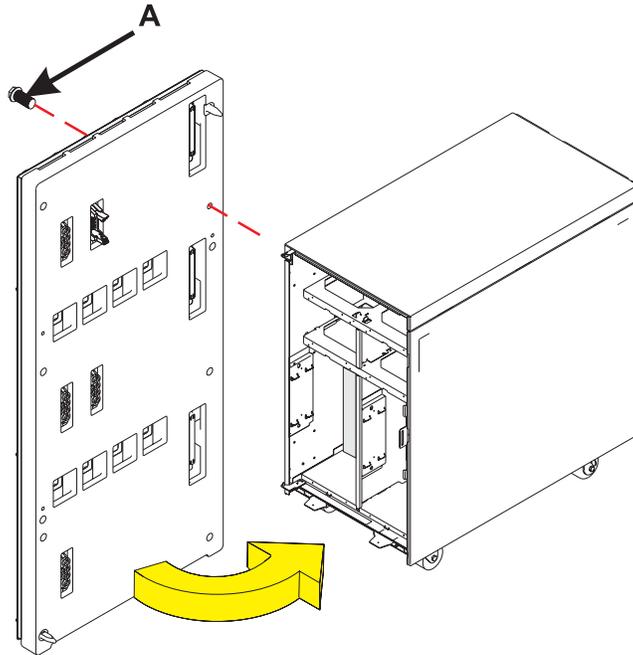
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle (**A**) down, then pushing the handle upward to lock it into place.



35.

Install the device board assembly

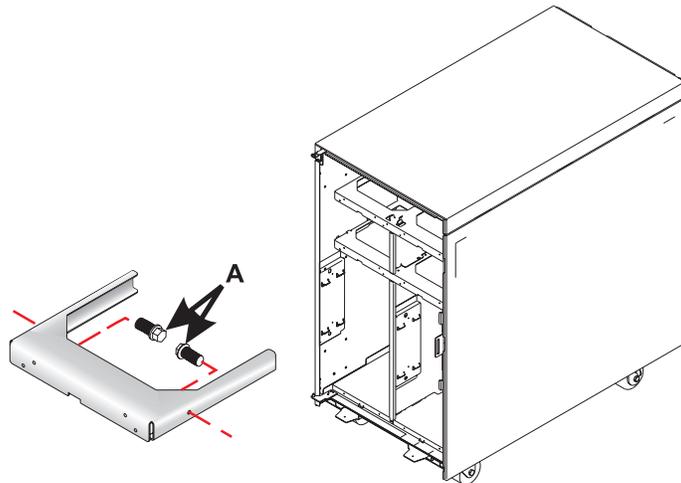
1. Install the DB1 device board assembly into the frame.
2. Connect the cables that were previously removed to the rear of the DB1 device board assembly.
3. Rotate the device board assembly 90 degrees, then push the device board assembly towards the frame until it slides onto the guide pins.
4. Install the retaining screw (A) that holds the DB1 device board assembly to the frame.



36.

Install the device board shelf

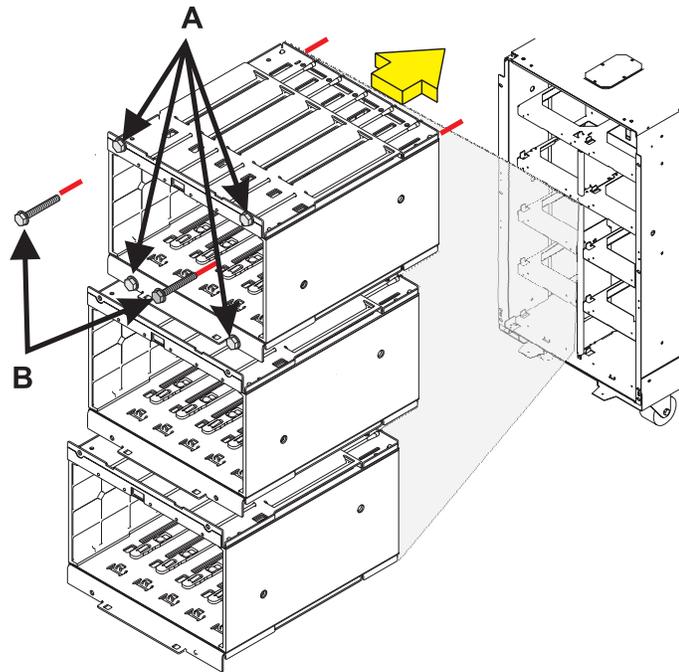
1. Install the two device board shelves that cover DB1 in the frame.
2. Install the two screws (A) that hold each device board shelf to the frame.



37.

Install the disk unit enclosures

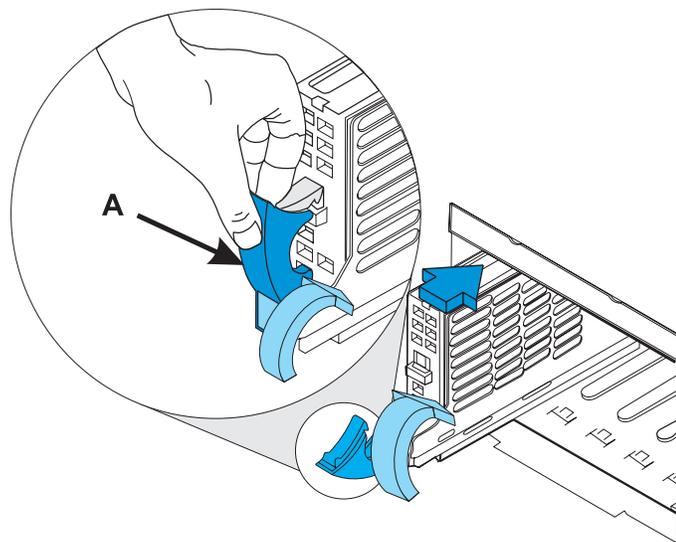
1. Install the disk unit enclosures, making sure to line up the guide pins when sliding the enclosures in.
2. Install the two long retaining screws (**B**) inside of the disk unit enclosure (the top right and bottom left corners).
3. Install the four screws (**A**) that hold the disk unit enclosure to the frame.



38.

Install the disk unit

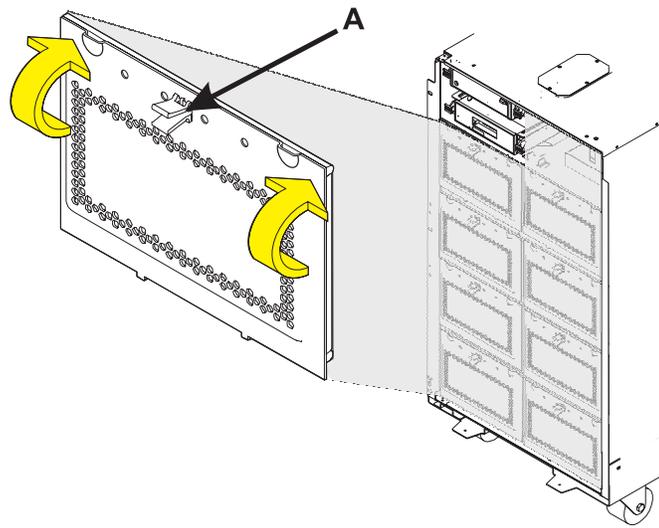
Install the disk unit in the proper location in the disk unit enclosure by sliding it in with the handle (**A**) down, then pushing the handle upward to lock it into place.



39.

Install the EMC access plate in the disk unit enclosure

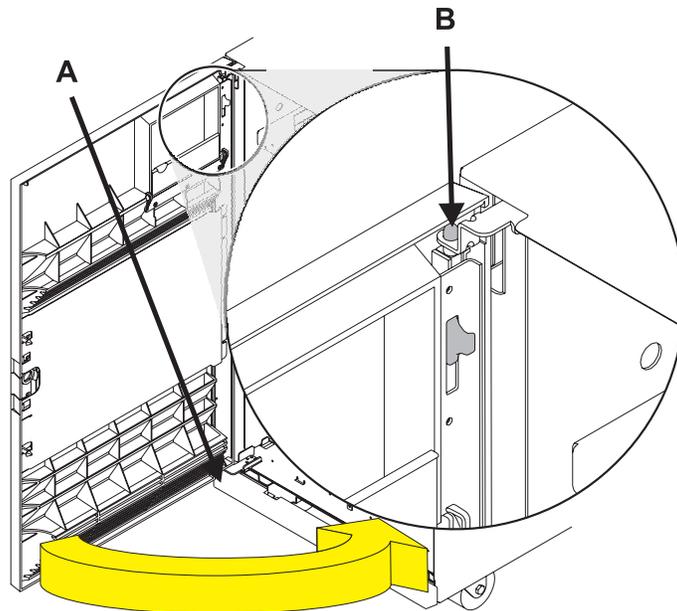
1. Align the two tabs in the EMC access plate with the two notches in the disk unit enclosure.
2. Push the top of the access plate towards the frame until the latching mechanism (A) engages.



40.

Install the front cover

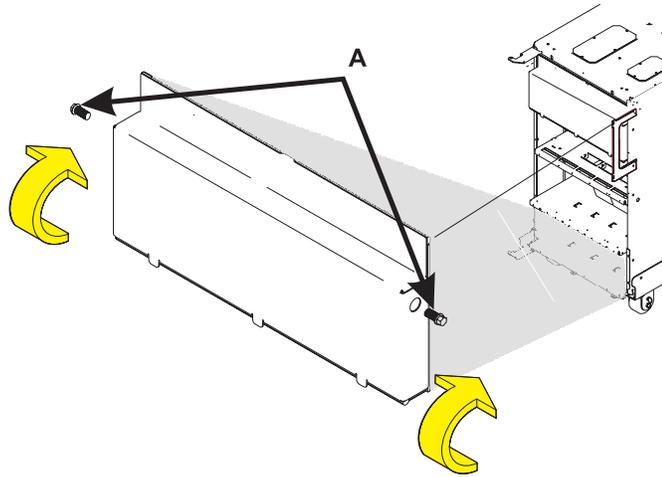
1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



41.

Install the EMC access plate in the battery enclosure

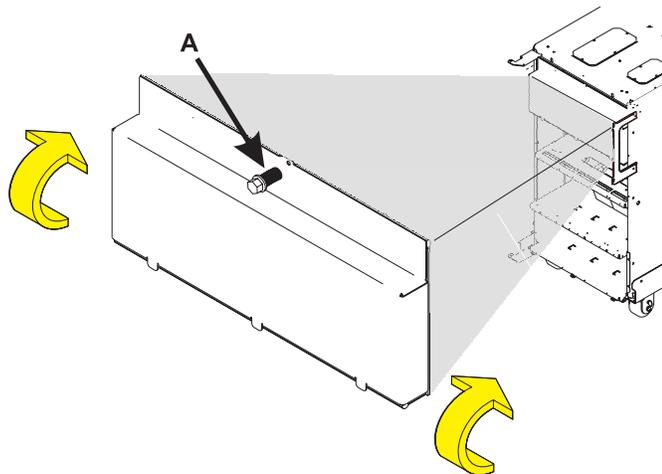
1. Align the three tabs in the EMC access plate with the three notches in the battery enclosure.
2. Install two screws (A) in the EMC access plate.



42.

Install the EMC access plate above the PCI card cage assembly

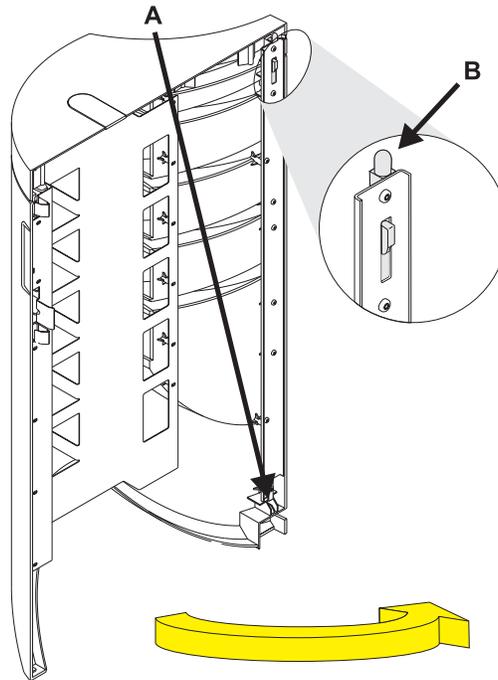
1. Align the three tabs in the EMC access plate with the three notches in the frame.
2. Install one screw (A) in the EMC access plate.



43.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



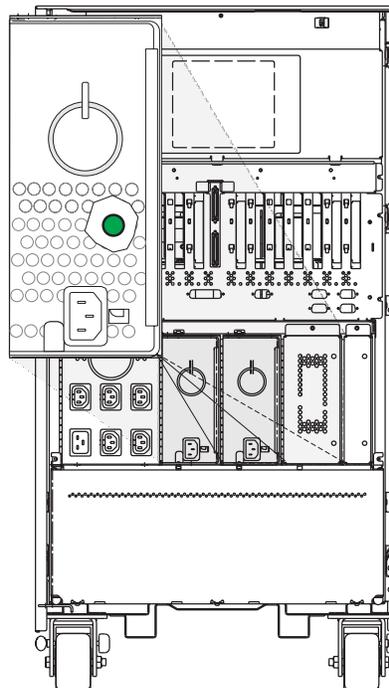
Power supply

1.

You must determine if the repair can continue concurrently. To continue the repair concurrently, the following condition must be true:

- Another power supply, which has its green LED on and not blinking, must already be installed at either location or .

If this condition is not true, the repair can continue only after powering off the unit containing the FRU that is being repaired. If the unit is already powered off, you may proceed with a non-concurrent repair.



2.

Continue the repair concurrently or nonconcurrently.

To continue with power on, go to Step 4.

To continue with power off, continue with the next Step.

3.

Use this procedure to service the Power Supply - P00, P01, P02, and P03.

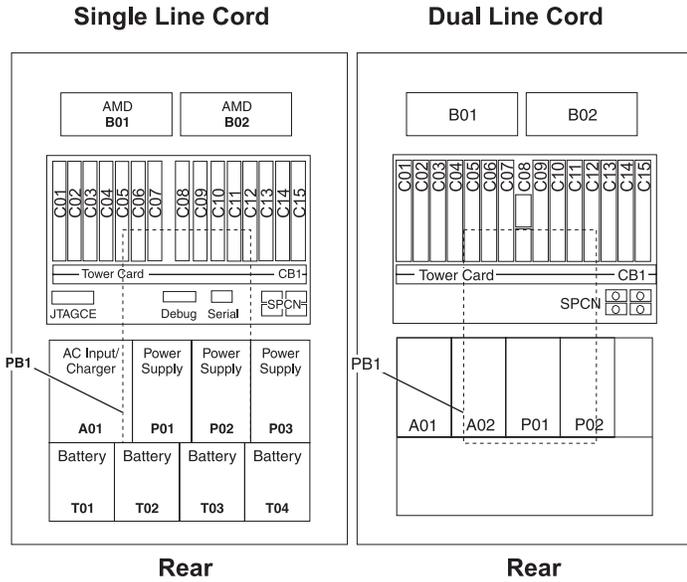
The Power Supply is in location:

Machine Type:

Model:

Serial Number:

The component will not be serviced concurrently. Power should be removed from the unit containing the FRU in the location field above. If this unit is powered on, power it off now. When the unit is completely powered off, disconnect the AC input source by removing the power cord from the unit. Do not apply power to the unit until directed to do so in this procedure.



Continue with Step 5 on page 80.

4.

Use this procedure to service the Power Supply - P00, P01, P02, and P03.

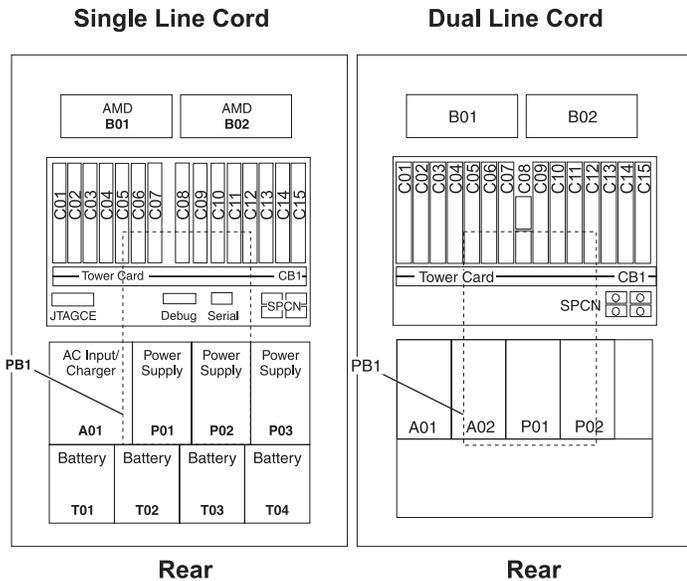
The Power Supply is in location:

Machine Type:

Model:

Serial Number:

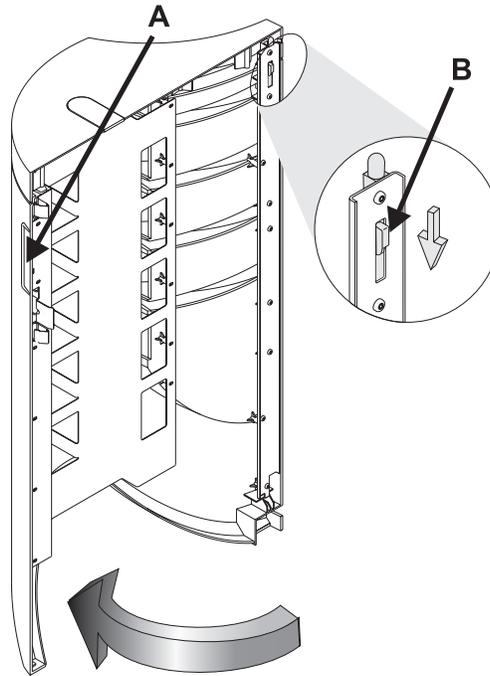
The component will be serviced concurrently. Power should not be removed from the unit containing the FRU in the location field above. Do not remove power to the unit during this repair procedure.



5.

Remove the rear cover

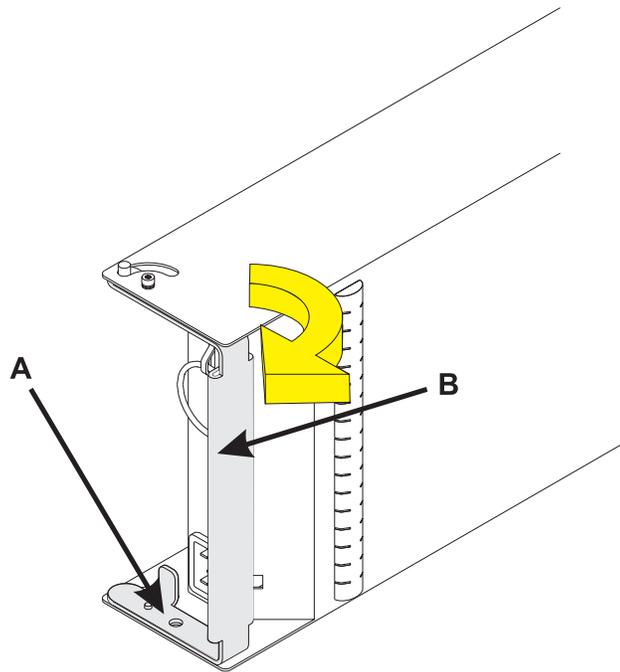
1. Open the cover by grasping its right side (A) and pulling it towards you.
2. **Note:** The rear cover will swing open a little more than 90 degrees. This makes it possible to replace all FRUs, without having to remove the cover.
3. After opening the cover, press down on lever (B), which is located inside along the top, left side of the cover.
4. Tilt the top of the cover away from the tower, and lift the cover off.



6.

Remove the power supply

1. Disconnect the power jumper cord from the unit that you are replacing.
2. **DANGER: Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source.**
3. Remove the bottom screw (A) (if installed).
4. Rotate the handle (B) in the direction shown to release the power supply from the frame.
5. Remove the power supply by pulling the handle (B) straight out from the frame.



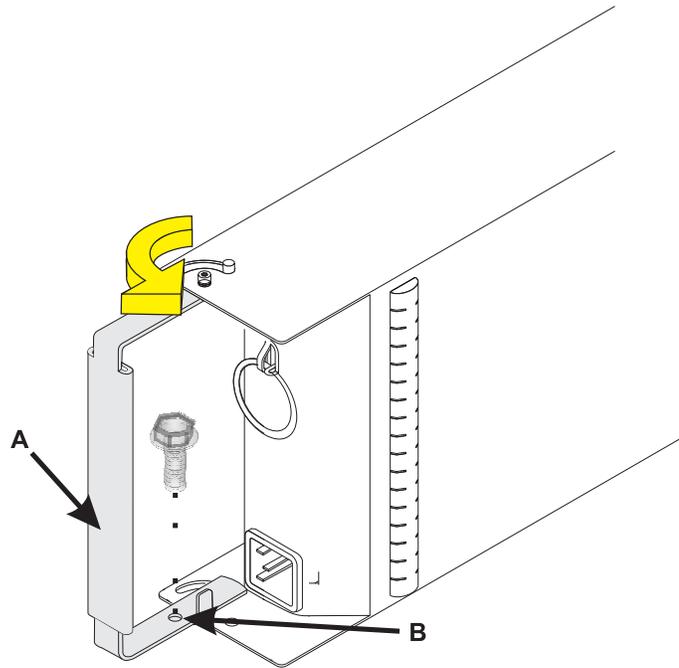
7.

Install the power supply

Note: Do not slam the power supply in when installing it into the system.

1. Carefully insert the power supply until it is engaged in the frame.
 2. Rotate the handle (A) in the direction shown to secure the power supply in the frame.
 3. Install the bottom screw (B) (if previously removed).
 4. Connect the power jumper cord to the unit that you are replacing.
- 5.

DANGER: Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source.

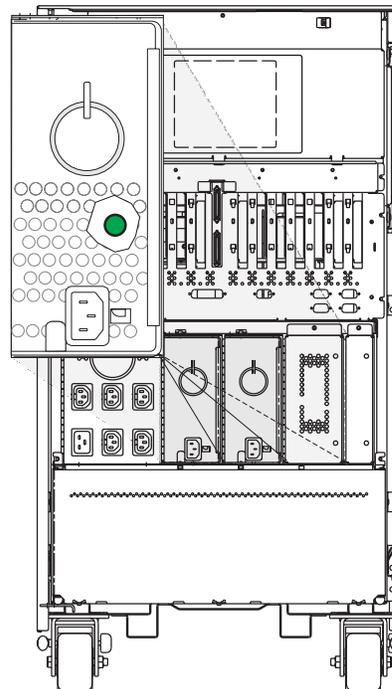


8.

You must determine if the new power supply is operational. The new power supply is operational if its green LED is lit (either solid or blinking).

For a non-concurrent repair, you may have to continue this repair procedure until FRU level activation completes, before using the LED to determine if the new power supply is operational.

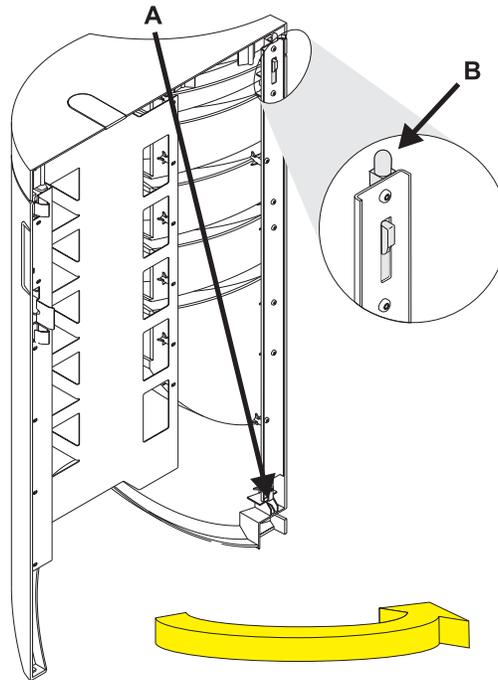
If the LED is not lit, you must determine why. Make sure the power supply is plugged into a working AC power source, try installing a different power supply, or call your next level of support.



9.

Install the rear cover

1. Tilt the top of the cover towards you while inserting the lower corner pin (A) into the lower hole in the cover.
2. Tilt the top of the cover towards the tower until the spring loaded upper pin (B) seats into the upper hole in the enclosure.
3. Grasp the right side of the cover and push it towards the frame to close it.



Backplane

1. Power off the expansion unit using Powering off an expansion unit.

Note: The primary I/O unit backplane cannot be replaced concurrently.

2. Open the rear cover.
3. Disconnect the plugs to each power supply.
4. From the rear of the expansion unit do the following:
 - a. Remove the external cables from the rear of the PCI card enclosure and note their locations.
 - b. Remove the EMC access plate that is located directly above the PCI card enclosure. Press the surfaces of the two latching mechanisms together and tilt the top of the cover away from the frame to remove it.
 - c. Remove the cables from the top of the PCI cards and note their locations.

Attention: All cards are sensitive to electrostatic discharge.
 - d. Remove the screws that hold the PCI card enclosure to the frame.
 - e. Pull the PCI card enclosure partially out of the frame while lifting the cables clear of the enclosure.
 - f. Press the release mechanism that is located along the top right side of the enclosure and carefully slide the enclosure towards you. Make sure that the cables are clear of the enclosure.
5. Remove the PCI cards from the enclosure and note their locations (see "PCI card" on page 53).
6. Install the new PCI card enclosure by reversing the above procedure. Then continue with the next step.
7. Reconnect the power cord(s) and/or the power supply cords that you disconnected earlier.

Note: The expansion unit will power on automatically.

8. Perform Setting expansion unit configuration ID and MTMS value and then continue with the next step of this procedure.

9. Go to Verifying a repair. **This ends the procedure.**

Setting I/O enclosure configuration ID and MTMS value

This topic provides instructions for setting system values.

To set the configuration ID, use the Advanced System Management Interface (ASMI). However if the ASMI is not available you can use the physical control panel.

Set the machine type-model-serial (MTMS) value for the enclosure to match the original value, which can be found on a label affixed to the enclosure. Updating the MTMS value keeps the configuration and error information in sync, and is used by the system when creating the location codes. To update the MTMS values you *must* use ASMI, *not* with the control panel. However, if you do not have access to the ASMI, the system will still operate without updating this information

Note: For information about setting up the ASMI, go to Managing the Advanced System Management Interface (ASMI) chapter in your host server service guide. For information on using the ASMI, including updating the system configuration settings, go to the Managing your server using the Advanced System Management Interface chapter in your host server service guide.

Powering off an expansion unit

This procedure provides detailed instructions for powering off an expansion unit.

Before beginning, read this entire procedure. If there are procedural steps that cannot be performed at this time, the procedure must be delayed until a later time.

Attention: If the server is not HMC-managed and there is no IBM i service partition, the expansion unit power cannot be turned off with the server power turned on.

Attention: Do *not* use this procedure to replace disk units that are supported under device concurrent maintenance. Use the device concurrent maintenance procedure instead.

Attention: Do *not* use this procedure on the system unit or the system unit's integrated expansion unit. For system units and system units' integrated expansion units see your system service guide.

Notes:

1. References to the console in this procedure refer to the console of the logical partition in which you are working.
2. Throughout this procedure, the term *HSL I/O bridge* is interchangeable with *RIO adapter*.
3. Throughout this procedure, the term *tower* is interchangeable with *expansion unit*.
4. Messages that may be generated on the HMC during the procedure refer to specific partitions by their partition IDs. A partition's ID is a numeric value that represents the order in which the partitions were created. The partitions listed in the Server Management content area are not necessarily listed in order of partition ID. A partition's ID is listed under the *General* tab in the Partition Properties.

Perform the following with the assistance of the customer:

1. If you have not already done so, record the expansion unit's location code and machine type-model-serial numbers (MTMS).
2. Can the expansion unit be powered off with the server powered on (the server is HMC-managed or has an IBM i service partition), and does the customer want to perform the procedure with the server powered on?

No: The expansion unit must be powered off by powering off the server. See your system service guide for instructions on powering off the server, then return to the procedure that sent you here.

Yes: Go to step 3.

Note: If the activated firmware level of the server to which the expansion unit is attached is lower than SF235, there is a small chance that bus numbers for the PCI buses in the expansion unit will change if the I/O backplane in the expansion unit is replaced with the server powered off. If this occurs on a server with multiple logical partitions, the I/O slot resources in the expansion unit will have to be reassigned to the appropriate partitions. Additionally, AIX logical resource names of the I/O resources in the expansion unit may change requiring some manual reconfiguration in the partition. If the I/O backplane is replaced with the server powered off, be prepared to perform these reconfiguration activities after the procedure. If the I/O backplane is replaced with the server powered on, either to firmware standby or firmware running, reconfiguration will not be required.

If it is desirable to replace the I/O backplane with the server powered off, but configuration changes cannot be tolerated, powering off the server and then powering it on to firmware standby state before performing the procedure might be a satisfactory alternative.

The activated firmware level of the server is displayed in the upper right corner of the ASMI utility.

3. Verify that the expansion unit being powered off is the correct one. If the expansion unit has an alphanumeric display on the control panel, you can verify that the type, model, and serial number of the expansion unit displayed on the user interface match that shown on the control panel display. Otherwise, you can activate the Identify indicator on the expansion unit. To activate the Identify indicator on the expansion unit, do the following steps for your particular interface:

- From the HMC V7 and later, use: **Select managed system** → **Operations** → **LED Status** → **Identify LED**. Select the desired expansion unit and use the Activate LED to turn on the LED and thus verify that the tower is the correct one. Then, use the Deactivate LED to turn off the LED.
- From the HMC V6R1.3 or earlier, use: **Service Focal Point** → **Service Utilities** → **Identify LED processing**.
- From IBM i use: **System (or Dedicated) Service Tools** → **Start a service tool** → **Hardware service manager** → **Packaging hardware resources** → **Concurrent maintenance** → **Toggle LED blink off/on**.
- Are you powering off the correct expansion unit?

No: Choose the correct expansion unit. Then perform this procedure again.

Yes: Go to step 4.

4. The system will not allow the expansion unit to be powered off if there are failed or inactive links in the HSL loop that the expansion unit is on, other than the links adjacent to the expansion unit. If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if there are failed or inactive links. .

Are there external links that are not operational in the HSL loop, other than those adjacent to the expansion unit being powered off?

No: Go to step 5.

Yes: Repair the failed or inactive links, except those adjacent to the expansion unit being powered off. If you need assistance, contact your service provider. Then perform this procedure again.

5. Verify that the SPCN loop is complete. A 10009135 reference code in the error log indicates an incomplete SPCN loop. A complete SPCN loop is not required, but is highly recommended. Powering off an expansion unit with an incomplete SPCN loop could cause lost contact with other expansion units on the SPCN loop. The expansion units that the system lost contact with will continue to function; however, the system may log additional errors and will not be able to monitor those units. Work with the customer to determine whether the SPCN loop is complete, whether correction is necessary, and then go to step 6.
6. If the system has only partitions running AIX® or Linux®, skip to step 10, if not go to step 7.
7. The system will not allow the expansion unit to be powered off if the expansion unit is configured as switchable and the system that owns the HSL I/O bridge (the logical owner of the expansion unit) is not the system that provides power to the expansion unit (the system whose SPCN the

expansion unit resides in, or SPCN system). If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if the expansion unit is configured as a switchable unit, either by asking the customer or referring to Determining if a tower is configured as switchable under iSeries® OptiConnect.

Note: Switchable expansion units will exist only if the server makes use of Switchable Independent Disk Pools.

Is the expansion unit configured as switchable?

No: The expansion unit is configured as private to this system. Go to step 10.

Yes: Go to step 8.

8. Determine if the logical owner of the expansion unit is the SPCN system by asking the customer or referring to Determining if a tower is configured as switchable under iSeries OptiConnect.

Is the logical owner of the expansion unit also the SPCN system?

No: Work with the customer to switch logical ownership of the HSL I/O bridge in the expansion unit to the SPCN system. This should be done using the iSeries OptiConnect user interface. If that is not successful due to problems with the iSeries OptiConnect user interface, it may be attempted as described in Switching ownership of a tower's switchable resources, however, this should be used only as a last resort since it may result in Cluster Resource Group (CRG) problems. If the switch cannot be performed, contact your service provider for assistance. Otherwise, continue with step 9 from the SPCN system.

Yes: Go to step 9.

9. The system will not allow the expansion unit to be powered off if it contains resources included in an active Cluster Resource Group (CRG). If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if the expansion unit contains resources included in an active CRG by asking the customer.

Does the expansion unit contain resources included in an active CRG?

No: Go to step 10.

Yes: Work with the customer to end each active CRG that contains resources in the expansion unit.

10. Determine if any of the I/O resources in the expansion unit are owned by partitions running Linux. Are any of the I/O resources in the expansion unit owned by partitions running Linux?

No: Go to step 11.

Yes: Power off the partitions running Linux and go to step 11.

11. Determine if any of the I/O resources in the expansion unit are owned by partitions running AIX. Are any of the I/O resources in the expansion unit owned by partitions running AIX?

- **No:** Go to step 12.

- **Yes:** Do the partitions have a code level that supports the powering off and on of an expansion unit with the partition running? The required level for AIX 5.2 is 5.2.0.61 or later and the required level for AIX 5.3 is 5.3.0.22 or later. You can determine the level of AIX by invoking the command **lspp -l devices.chrp.base.rte** from the AIX command line.

- **Yes:** Does the HMC have a code level that supports power off and on of an expansion unit with I/O resources assigned to active partitions running AIX? The required HMC code level is version 4, release 5.0 or later. You can view the HMC code level by accessing: **Licensed Internal Code Maintenance** → **HMC Code Update**. The code level appears in the content area.

Yes: Go to step 12.

No: Power off the partitions that are running AIX and that own I/O resources in the expansion unit, then go to step 12.

- **No:** Power off the partitions that are running AIX and that own I/O resources in the expansion unit, then go to step 12.

12. Work with the customer to end I/O activity to the expansion unit by performing the following steps. If all partitions that own I/O resources in the expansion unit have been powered off, skip this step and go to step 13.

- In IBM i partitions:

- Work with the customer to vary off all configuration descriptions (for example, ctl, device, line, network server, etc.) that use resources in the expansion unit. This can be done using the **vrycfg** command. The system will not allow the expansion unit to be powered off unless all configuration descriptions that use resources in the expansion unit are varied off. If an attempt is made to power off the expansion unit when there are configuration descriptions that use resources in the expansion unit that are varied on, a descriptive error message will be presented.

Note: If configuration descriptions that use resources in the expansion unit cannot be varied off, the procedure must be delayed until they can be varied off or the partitions that have such configuration descriptions must be powered off.

- If the expansion unit contains disk unit IOPs and/or IOAs, and the disk units are not mirrored to disk units in other expansion towers, work with the customer to end all communications activities to these disk units by ending all subsystems.

Note: The system allows you to power off the expansion unit even if this is not done, however, doing so may result in a disk unit attention SRC and a partial or complete hang of the partition until the expansion unit is powered on.

- If the expansion tower contains disk unit IOPs and/or IOAs and these disk units are mirrored to disk units in other expansion towers, you do not need to end all subsystems. Mirroring will assist during the service action.

- In AIX partitions:

- Work with the customer to unconfigure all logical device resources that use resources in the expansion unit. This can be done using the **rmdev** command. The system will not allow the expansion unit to be powered off unless all logical device resources that use resources in the expansion unit are unconfigured. If an attempt is made to power off the expansion unit when there are configured logical device resources that use resources in the expansion unit, a descriptive error message is presented.

- If logical device resources that use resources in the expansion unit cannot be unconfigured, the procedure must be delayed until they can be unconfigured or the partitions that have such resources must be powered off.

- Following is an example of the type of message that is displayed if there are logical AIX resources that must be unconfigured. It shows two messages. The first indicates that logical device resource pci11 with physical name U5294.001.23B2424-CB1-C01 must be unconfigured. To unconfigure this resource invoke the AIX command **rmdev -R -l pci11**. The second indicates that logical device resources pci6 and ent0 with physical name U0595.001.435DF30-CB1-C02 must be unconfigured. To unconfigure these resources invoke the AIX command **rmdev -R -l pci6**.

Reporting partition type: RPA

Return code type: Failure (hard stop or user intervention required).

Message:

com.ibm.hsc.client.rmc.HSCRMCEException: Query operation for slot resource has failed on partition 2.

The partition command is:

```
drmgr -Q -c slot -s U5294.001.23B2424-CB1-C01 -w 0 -d 3
```

The partition standard output is:

```
drsloc_chrp_slot: slot_type=1 all slots=0x20042d68
```

The partition standard error is:

0931-029 The specified slot contains a device or devices that are currently configured. Unconfigure the following device or devices and try again.

pc11

The RMC return code is 0. The AIX return code is 1.

Reporting partition type: RPA

Return code type: Failure (hard stop or user intervention required).

Message:

com.ibm.hsc.client.rmc.HSCRMCEException: Query operation for slot resource has failed on partition 2.

The partition command is:

```
drmgr -Q -c slot -s U0595.001.435DF30-CB1-C02 -w 0 -d 3
```

The partition standard output is:

```
drsloc_chrp_slot: slot_type=1 all slots=0x20042ca8
```

The partition standard error is:

0931-029 The specified slot contains a device or devices that are currently configured. Unconfigure the following device or devices and try again.

ent0

pci6

The RMC return code is 0. The AIX return code is 1.

- The following AIX commands are helpful in determining which logical device resources use an expansion unit. In the following examples, U0595.001.435DF30 is the location code of the expansion unit being powered off.

Displays information about logical device resource pci5:

```
lscfg -l pci5
```

Displays all logical resources in U0595.001.435DF30:

```
lscfg | grep U0595.001.435DF30
```

```
* pci5          U0595.001.435DF30-CB1          PCI Bus
+ sisioa0      U0595.001.435DF30-CB1-C01      PCI-X Dual Channel U320 SCSI RAID Adapter
+ scsi0        U0595.001.435DF30-CB1-C01-T1   PCI-X U320 SCSI RAID Adapter Physical bus
+ hdisk0       U0595.001.435DF30-CB1-C01-T1-L6-L0 16 Bit LVD SCSI Disk Drive (36400 MB)
* ses0         U0595.001.435DF30-CB1-C01-T1-L15-L0 SCSI Enclosure Services Device
+ scsi1        U0595.001.435DF30-CB1-C01-T2   PCI-X U320 SCSI RAID Adapter Physical bus
+ sisraid0     U0595.001.435DF30-CB1-C01-C1-T1  PCI-X U320 SCSI RAID Adapter Logical bus
```

Displays the rootvg hdisk(s):

```
lsvg -o
```

- The resources representing the partition's LAN connection to the HMC, such as ent0 and en0, must not be unconfigured or the procedure will not work. If these resources use the expansion unit, the partition must be powered off to continue with the procedure.

Attention: If resources in the expansion unit are assigned to I/O server partitions and are being used by I/O server partitions (also known as virtual I/O servers), work with the customer to determine whether powering off the expansion unit will negatively impact the client partitions. If so, the client partitions should be powered off before continuing.

13. Power off all external DVD-RAM storage devices (containing their own power supplies) connected to resources in the expansion unit, then go to step 14.
14. Use one of the following procedures to power off the expansion unit. Carefully follow the instructions provided by the utility to complete the power off.

Attention: If the server is not HMC-managed and there is no IBM i service partition, the expansion unit power cannot be turned off with the server power turned on.

To turn off the power in an expansion unit with the server power on, do one of the following procedures:

- If the server is HMC-managed, the power off and power on functions must be performed using the Power On/Off Unit utility on the HMC.
 - For HMC V6R1.3 and earlier, do the following steps:
 - a. In the navigation area, open the Service Applications folder.
 - b. Select **Service Focal Point**.
 - c. In the contents area, select **Service Utilities**.
 - d. In the Service Utilities window, select the system on which you are working.
 - e. Select **Selected** → **Power On/Off Unit**
 - For HMC V7 and later, do the following steps:
 - a. Select the managed system, then select **Serviceability** → **Hardware** → **Power on/off IO Unit**.
 - b. In the Power on/off IO Unit window, expand the Managed system I/O and select the appropriate unit.
 - c. Click the **Power off** button.
- If the server is not HMC-managed, the power off and power on functions must be performed using the Packaging Hardware Resources utility from the IBM i service partition, do the following steps:
 - a. Access the System Service Tools or the Dedicated Service Tools on the IBM i service partition.
 - b. Select **Start a service tool**
 - c. Select **Hardware service manager**
 - d. Select **Packaging hardware resources**
 - e. Select **Concurrent maintenance**

Notes:

- a. If the procedure is being done from an IBM i partition, the system will not allow it to be done from a console or terminal session connected through the expansion unit being powered off. A different console or terminal session not connected through the expansion unit being powered off must be found, or the server must be powered off. See your system service guide for instruction on powering off the server, then return to the procedure that sent you here.
- b. If I/O activity to resources in the expansion unit was not ended as described in step 12, the power off will not be allowed and messages will be presented indicating which partition resources need to be varied off or unconfigured. Similarly for other conditions described previously in this page that prevent the power off.
- c. Carefully follow all instructions given by the utility. For instance, you may be informed that critical disk resources exist in the expansion unit and that panel function 69 must be used to power the expansion unit back on.
- d. Wait for the expansion unit to power off. This might take up to 15 minutes depending on the configuration.

- e. When the utility gives notification that the power off has completed, ensure that the expansion unit is actually powered off by verifying that one of the two air moving devices (AMDs) in the expansion tower has stopped and that the power LED/indicator on the expansion unit control panel is off.
 - f. If the expansion unit does not power off after more than 15 minutes, the system may be hung. If this occurs, contact your service provider for assistance.
15. Were you directed here to power off the expansion unit to set the expansion unit configuration ID or the machine type-model-serial numbers (MTMS)?
 - No:** Go to step 16.
 - Yes:** Return to the procedure that sent you here.
 16. Does the procedure that sent you here instruct you to remove the ac power from the expansion unit?
 - No:** Return to the procedure that sent you here.
 - Yes:** Go to step 17.
 17. Is this an expansion unit with ac power cords connected from this unit's ac input/charger to an SPCN controlled expansion unit (for example: a 5088 expansion I/O unit)?
 - No:** This expansion unit can be serviced without affecting an SPCN controlled expansion unit. Return to the procedure that sent you here.
 - Yes:** Servicing this expansion unit may affect an SPCN controlled expansion unit that is receiving ac power from this tower. Go to step 18.
 18. You may be able to maintain ac power to the expansion unit that is receiving ac power from this expansion unit and remove power from this expansion unit so that you can service it. The following steps will help you to determine what you can do. Were you directed to this procedure as part of a procedure to exchange the ac input/charger, any of the device boards, or the power board?
 - No:** You can maintain ac power to the expansion unit receiving ac power from this expansion unit while you are servicing this expansion unit. When the expansion unit is powered off, open the rear cover and trace the ac jumper cords from the three power supplies to the ac input charger. Then disconnect them at the ac charger. Power is now removed from the components that you will be working with or near. Return to the procedure that sent you here.
 - Yes:** You must search for an alternate ac power source for the expansion unit receiving ac power from this expansion unit. Go to step 19.
 19. Can you find an alternate ac power source for the expansion unit that is receiving ac power from this expansion unit?
 - No:** You must power off the system to service this expansion unit. See your system service guide for instructions on powering off the system, then return to the procedure that sent you here.
 - Yes:** Move each of the expansion unit's ac power cords one at a time to the alternate ac power source to prevent the expansion unit from losing ac power. Return to the procedure that sent you here.

Determining the power controlling and current logical system ownership of an expansion unit

Determine the power controlling system of an expansion unit and the current logical owning system.

1. From the Logical Hardware Resources screen, select **High-Speed Link Resources**.
2. Go to the HSL Loop with the expansion unit you wish to learn about. Select **option 5** (Display detail) and press **Enter**.
3. Press F8 (Follow Leading Port) until you reach the expansion unit you want to learn about.
4. Press F11 (Display System Information). There will be a section called SPCN System Information. That will have the system serial number for the power controlling system. The current logical owning system will be labeled as "owner."

Switching ownership of an expansion unit's switchable resources

It may be necessary for the local system to take or release ownership of a switchable resource.

You can use the *Take/release ownership* option on the Select I/O Debug Function display to have the local system take ownership of a resource or to have the local system release its ownership of a resource. Ownership of a resource indicates which system controls the functions of a resource. Ownership may be released only by the system that presently owns it.

The following procedure will direct you to switch ownership of switchable resources in an expansion unit from the current owner to the alternate system that can own those resources. To perform this procedure, you must know:

- The system that currently owns the switchable resources in an expansion unit. This is the system that you are going to *release* the resources from.
- The alternate system that can *take* ownership of the switchable resources.
- The resource name of the high speed link (HSL) I/O bridge resource and the HSL loop number on the currently owning system that will *release* ownership.
- The resource name of the high speed link (HSL) I/O bridge resource and the HSL loop number on the system that will *take* ownership.

Attention: Perform this procedure only if you are not able to switch the ownership of the resource using the OptiConnect user interface. Cluster Resource Group (CRG) problems may occur as the result of using this procedure when the OptiConnect user interface is available.

1. Determine the current owner of the switchable resources in the expansion unit if you have not already done so. (See the procedure "Determining the power controlling and current logical system ownership of an expansion unit" on page 89.)
2. Move to the console of the system that is the current owner of the switchable resources in the expansion unit.
3. Sign on to System Service Tool (SST) or Dedicated Service Tool (DST).
4. Select **Start a service tool**.
5. Select **Hardware Service Manager**.
6. Select **Logical Hardware Resources**.
7. Select **High speed link resources**.
8. Select the function **Include non-reporting resources**.
9. Select **Resources associated with loop**.
10. Move the cursor to the HSL I/O bridge resource in the expansion unit. Search for the resource name that the currently owning system assigned to the HSL I/O bridge resource.
11. Select the **I/O Debug** option.
When you select the I/O debug option on an HSL I/O bridge that has the capability of being switched, the I/O Debug Function display appears.
12. From the Select I/O Debug Function display, select the **Take/release ownership** option. The Confirm Release of Resource Ownership display appears.

Note: If you select option two to release ownership of the resource and another system currently owns it, the following message appears at the bottom of the screen:

Ownership of this resource cannot be released. It is owned by another system.

13. Record the **type-model** and the **serial number** of the HSL I/O bridge resource if you have not already done so.
14. Press Enter to confirm releasing the resource.

15. Move to the console of the other system that can take ownership of the switchable resources in the expansion unit.
16. Sign on to System Service Tool (SST) or Dedicated Service Tool (DST).
17. Select **Start a service tool**.
18. Select **Hardware Service Manager**.
19. Select **Logical Hardware Resources**.
20. Select **High speed link resources**.
21. Select the function **Include non-reporting resources**.
22. Move the cursor to the HSL I/O bridge resource in the expansion unit. Search for the resource name that this system assigned to the HSL I/O bridge resource.
23. Select the **I/O Debug** option.
24. From the Select I/O Debug Function display, select the **Take/release ownership** option. The Confirm Ownership Change display will appear.
25. Press Enter to confirm the ownership change. **This ends the procedure.**

Determining whether an expansion unit is configured as switchable under OptiConnect

You can determine whether an expansion unit is configured as a switchable expansion unit under OptiConnect by performing the following procedure.

Note: To perform this procedure, you must have the resource name of the high speed link (HSL) I/O bridge resource.

1. Move to the console of the system where you know the name of the HSL I/O bridge resource in the expansion unit.
2. Sign on to the System Service Tool (SST) or Dedicated Service Tool (DST).
3. From the SST or DST, select **Start a service tool**, then **Hardware Service Manager**.
4. From the Hardware Service Manager, select **Logical Hardware Resources**.
5. From the Logical Hardware Resources display, select **High Speed Link Resources**.
6. From the High Speed Link Resources display, select the function **Include non-reporting resources**.
7. Move the cursor to the HSL I/O bridge resource of the expansion unit and select the **Display detail** option. The Display HSL Information display appears.
8. At the Display HSL Information display, locate the **Mode** information of the resource.

Note: If you cannot locate the **Mode** information, then this HSL resource is not part of a Cluster Resource Group (CRG) and the expansion unit where this HSL I/O bridge resource is located cannot be configured as switchable under OptiConnect.
9. Is the mode listed as *Private* or is the mode not displayed for this resource?
 - **Yes** = the expansion unit where this HSL I/O bridge resource is located cannot be configured as switchable under OptiConnect. **This ends the procedure.**
 - **No** = the HSL I/O bridge resource has a mode of *switchable*. The expansion unit is configured as a switchable expansion unit under OptiConnect. Continue with the next step of this procedure.
10. Record the HSL loop number, the type-model, and the serial number of the HSL I/O bridge resource.

Note: You will need the type-model and serial number to identify the HSL I/O bridge on the other system that can own this resource.

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Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

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REFERENCE
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