Power Systems

*Problem analysis, system parts, and
locations for the 9183-22X*

IBM

> **Note**
>
> Before using this information and the product it supports, read the information in "Safety notices" on page v, "Notices" on page 33, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125–5823.

Contents

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, safety information documentation is included in the publications package (such as in printed documentation, on DVD, or as part of the product) shipped with the product. The documentation 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 documentation. You should also refer to the safety information documentation any time you do not clearly understand any safety information in the U.S. English publications.

Replacement or additional copies of safety information documentation can be obtained by calling the IBM Hotline at 1-800-300-8751.

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

IBM servers may be installed inside or outside of an IT equipment rack.

 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: If IBM supplied the power cord(s), 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. For AC power, disconnect all power cords from their AC power source. For racks with a DC power distribution panel (PDP), disconnect the customer's DC power source to the PDP.
- When connecting power to the product ensure all power cables are properly connected. For racks with AC power, 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. For racks with a DC power distribution panel (PDP), connect the customer's DC power source to the PDP. Ensure that the proper polarity is used when attaching the DC power and DC power return wiring.
- 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.
- Do not attempt to switch on power to the machine until all possible unsafe conditions are corrected.
- When performing a machine inspection: Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements. Do not attempt to switch power to the machine until all possible unsafe conditions are corrected. Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.
- 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) For AC power, remove the power cords from the outlets. 3) For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source. 4) Remove the signal cables from the connectors. 5) 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) For AC power, attach the power cords to the outlets. 5) For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP. 6) Turn on the devices.

- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

(R001 part 1 of 2):

 DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment–personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet if provided, unless the earthquake option is to be installed.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack mounted devices and do not use them to stabilize your body position (for example, when working from a ladder).

- Stability hazard:
  - The rack may tip over causing serious personal injury.
  - Before extending the rack to the installation position, read the installation instructions.
  - Do not put any load on the slide-rail mounted equipment mounted in the installation position.
  - Do not leave the slide-rail mounted equipment in the installation position.
- Each rack cabinet might have more than one power cord.
  - For AC powered racks, be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.

- For racks with a DC power distribution panel (PDP), turn off the circuit breaker that controls the power to the system unit(s), or disconnect the customer's DC power source, when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (R001 part 1 of 2)

(R001 part 2 of 2):

⚠️ **CAUTION:**

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- *(For sliding drawers.)* Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack or if the rack is not bolted to the floor. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.

- *(For fixed drawers.)* This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack. (R001 part 2 of 2)

⚠️ **CAUTION:** Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building.

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
  - Remove all devices in the 32U position and above.
  - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.

- Ensure that there are little-to-no empty U-levels between devices installed in the rack cabinet below the 32U level, unless the received configuration specifically allowed it.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2083 mm (30 x 82 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:

  - Lower the four leveling pads.
  - Install stabilizer brackets on the rack cabinet or in an earthquake environment bolt the rack to the floor.
  - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

(L001)

⚠ **DANGER:** Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)

(L002)

⚠ **DANGER:** Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack-mounted devices and do not use them to stabilize your body position (for example, when working from a ladder). Stability hazard:

- The rack may tip over causing serious personal injury.
- Before extending the rack to the installation position, read the installation instructions.

- Do not put any load on the slide-rail mounted equipment mounted in the installation position.
- Do not leave the slide-rail mounted equipment in the installation position.

(L002)

(L003)
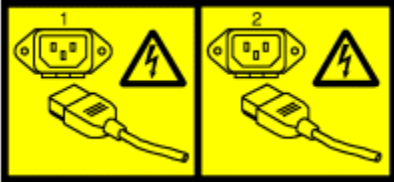
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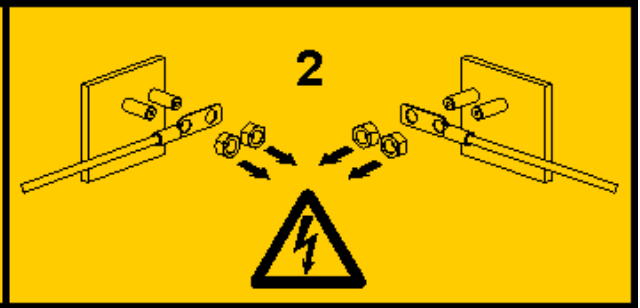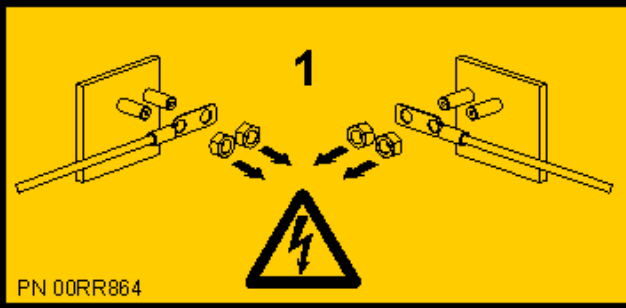
DANGER: Multiple power cords. The product might be equipped with multiple AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (L003)

(L007)

CAUTION: A hot surface nearby. (L007)

(L008)

CAUTION: Hazardous moving parts nearby. (L008)

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. Although shining light into one end and looking into the other end of a disconnected optical fiber to verify the continuity of optic fibers may not injure the eye, this procedure is potentially dangerous. Therefore, verifying the continuity of optical fibers by shining light into one end and looking at the other end is not recommended. To verify continuity of a fiber optic cable, use an optical light source and power meter. (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)

(C030)

CAUTION: The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:

- Throw or immerse into water

- Heat to more than 100 degrees C (212 degrees F)

- Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. 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. (C003)

CAUTION: Regarding IBM provided VENDOR LIFT TOOL:

- Operation of LIFT TOOL by authorized personnel only.

- LIFT TOOL intended for use to assist, lift, install, remove units (load) up into rack elevations. It is not to be used loaded transporting over major ramps nor as a replacement for such designated tools like pallet jacks, walkies, fork trucks and such related relocation practices. When this is not practicable, specially trained persons or services must be used (for instance, riggers or movers).

- Read and completely understand the contents of LIFT TOOL operator's manual before using. Failure to read, understand, obey safety rules, and follow instructions may result in property damage and/or personal injury. If there are questions, contact the vendor's service and support. Local paper manual must remain with machine in provided storage sleeve area. Latest revision manual available on vendor's web site.

- Test verify stabilizer brake function before each use. Do not over-force moving or rolling the LIFT TOOL with stabilizer brake engaged.

- Do not raise, lower or slide platform load shelf unless stabilizer (brake pedal jack) is fully engaged. Keep stabilizer brake engaged when not in use or motion.

- Do not move LIFT TOOL while platform is raised, except for minor positioning.

- Do not exceed rated load capacity. See LOAD CAPACITY CHART regarding maximum loads at center versus edge of extended platform.

- Only raise load if properly centered on platform. Do not place more than 200 lb (91 kg) on edge of sliding platform shelf also considering the load's center of mass/gravity (CoG).

- Do not corner load the platforms, tilt riser, angled unit install wedge or other such accessory options. Secure such platforms -- riser tilt, wedge, etc options to main lift shelf or forks in all four (4x or all other provisioned mounting) locations with provided hardware only, prior to use. Load objects are designed to slide on/off smooth platforms without appreciable force, so take care not

to push or lean. Keep riser tilt [adjustable angling platform] option flat at all times except for final minor angle adjustment when needed.

- Do not stand under overhanging load.
- Do not use on uneven surface, incline or decline (major ramps).
- Do not stack loads.
- Do not operate while under the influence of drugs or alcohol.
- Do not support ladder against LIFT TOOL (unless the specific allowance is provided for one following qualified procedures for working at elevations with this TOOL).
- Tipping hazard. Do not push or lean against load with raised platform.
- Do not use as a personnel lifting platform or step. No riders.
- Do not stand on any part of lift. Not a step.
- Do not climb on mast.
- Do not operate a damaged or malfunctioning LIFT TOOL machine.
- Crush and pinch point hazard below platform. Only lower load in areas clear of personnel and obstructions. Keep hands and feet clear during operation.
- No Forks. Never lift or move bare LIFT TOOL MACHINE with pallet truck, jack or fork lift.
- Mast extends higher than platform. Be aware of ceiling height, cable trays, sprinklers, lights, and other overhead objects.
- Do not leave LIFT TOOL machine unattended with an elevated load.
- Watch and keep hands, fingers, and clothing clear when equipment is in motion.
- Turn Winch with hand power only. If winch handle cannot be cranked easily with one hand, it is probably over-loaded. Do not continue to turn winch past top or bottom of platform travel. Excessive unwinding will detach handle and damage cable. Always hold handle when lowering, unwinding. Always assure self that winch is holding load before releasing winch handle.
- A winch accident could cause serious injury. Not for moving humans. Make certain clicking sound is heard as the equipment is being raised. Be sure winch is locked in position before releasing handle. Read instruction page before operating this winch. Never allow winch to unwind freely. Freewheeling will cause uneven cable wrapping around winch drum, damage cable, and may cause serious injury.
- This TOOL must be maintained correctly for IBM Service personnel to use it. IBM shall inspect condition and verify maintenance history before operation. Personnel reserve the right not to use TOOL if inadequate. (C048)

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.

The dc-powered system is intended to be installed in a common bonding network (CBN) as described in GR-1089-CORE.

Beginning troubleshooting and problem analysis

This information provides a starting point for analyzing problems.

This information is the starting point for diagnosing and repairing systems. From this point, you are guided to the appropriate information to help you diagnose problems, determine the appropriate repair action, and then complete the necessary steps to repair the system.

Notes:

- Update the system firmware to the latest level before you start problem analysis. If you update the system firmware, you have the latest available fixes and improvements for error handling, reporting, and isolation. For instructions about updating the system firmware, see Getting fixes.
- Some service procedures use OpenBMC tool commands. To download and install the OpenBMC tool, see Managing the system by using the OpenBMC tool.

What type of problem are you dealing with?	Problem analysis procedure
You do not know the type of problem.	Go to "Determining the problem analysis procedure to perform" on page 1.
You have an FQPSP*xxxxxxx* event code.	Go to FQPSP*xxxxxxx* Event Codes.
A baseboard management controller (BMC) access problem occurred.	Go to "Resolving a BMC access problem" on page 2.
The system does not power on (the power button or the BMC power on command does not power on the system).	Go to "Resolving a power problem" on page 3.
A system firmware boot failure occurred (the system started but was not able to boot to the Petitboot menu).	Go to "Resolving a system firmware boot failure" on page 4.
A video graphics array (VGA) monitor problem occurred (the system started but no video is displayed on the monitor).	Go to "Resolving a VGA monitor problem" on page 5.
An operating system boot failure occurred (the system booted to the Petitboot menu but the operating system did not start).	Go to "Resolving an operating system boot failure" on page 6.
A processor, memory, power, or cooling hardware failure occurred.	Go to "Resolving a hardware problem" on page 7.
Missing or faulty graphics processing unit (GPU), PCIe adapter, disk drive, or solid-state drive.	Go to Resolving a GPU, PCIe adapter, or device problem.

Determining the problem analysis procedure to perform

Learn how to identify the correct problem analysis procedure to perform.

About this task

To determine the correct problem analysis procedure to perform, complete the following steps:

Procedure

1. After you apply power to the system, are the power supply LEDs green?

If	Then
Yes:	Continue with the next step.
No:	Go to "Resolving a power problem" on page 3.

2. Can you access the baseboard management controller (BMC) across the network?

If	Then
Yes:	Continue with the next step.
No:	Go to "Resolving a BMC access problem" on page 2.

3. Can you boot the system to the Petitboot menu?

If	Then
Yes:	Continue with the next step.
No:	Go to "Resolving a system firmware boot failure" on page 4.

4. Is video displayed on the video graphics array (VGA) monitor?

If	Then
Yes:	Continue with the next step.
No:	Go to "Resolving a VGA monitor problem" on page 5.

5. Can you start the operating system?

If	Then
Yes:	Continue with the next step.
No:	Go to "Resolving an operating system boot failure" on page 6.

6. Go to "Resolving a hardware problem" on page 7. **This ends the procedure.**

Resolving a BMC access problem

Learn how to identify the service action that is needed to resolve a baseboard management controller (BMC) access problem.

Procedure

1. Ensure that the BMC password is not set to the default password. For information about changing the default password, see Logging on to the OpenBMC GUI. Does the problem persist?

If	Then
Yes:	Continue with the next step.
No:	**This ends the procedure.**

2. Are both ends of the network cable seated securely?

If	Then
Yes:	Continue with the next step.
No:	Seat both ends of the cable securely. If the problem persists, continue with the next step.

3. Power off the system and disconnect all AC power cords for 30 seconds. Then, reconnect the AC power cords and power on the system. Does the BMC access problem persist?

If	Then
Yes:	Continue with the next step.

If	Then
No:	**This ends the procedure.**

4. Verify that the BMC network settings are correct.

   Note: To verify the BMC network settings, you must have a cabled serial connection or a monitor and keyboard.

   a) Power on the system by using the power button on the front of the system. Wait 1 - 2 minutes for the system to display the Petitboot menu.

   b) When the Petitboot menu is displayed, press any key to interrupt the boot process. Then, select Exit to Shell.

   c) For a shared BMC Ethernet port, type the following command and press Enter:

   ```
   ipmitool lan print 1
   ```

   For a dedicated BMC Ethernet port, type the following command and press Enter:

   ```
   ipmitool lan print 2
   ```

   Note: To determine the location of the shared and dedicated BMC Ethernet ports, see the rear ports topic in the IBM Power® System IC922 (9183-22X) Quick Install Guide.

   d) Verify that the MAC address and the IP address settings are correct. Then, continue with the next step.

   Note: If the IP address setting is incorrect, go to Configuring the BMC IP address. If the MAC address is 00:00:00:00:00:00, go to "Contacting IBM service and support" on page 18.

5. Complete the following actions:

   a. Power on to the Petitboot menu.

   b. Update the system firmware. For instructions, see Getting fixes.

   Are you able to access the BMC?

If	Then
Yes:	**This ends the procedure.**
No:	Continue with the next step.

6. Replace the system backplane. Go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.

7. Did you replace the system backplane and is the system firmware level OP940.20, or later?

   • **Yes**: Go to Updating the system firmware level of the BMC on the system backplane to OP940.20, or later, in a 9183-22X system.

   • **No**: **This ends the procedure**.

Resolving a power problem

Learn how to identify the service action that is needed to resolve a power problem.

Procedure

1. Is the amber LED of a power supply on solid and is the amber LED on the front of the system turned off?

If	Then
Yes:	Ensure that the power cords for both power supplies are fully seated and that the power distribution units (PDUs) and power outlets are supplying electricity. **This ends the procedure.**

If	Then
No:	Continue with the next step.

2. Are the power supply LEDs turned off?

If	Then
Yes:	Continue with the next step.
No:	Continue with step "4" on page 4.

3. Perform the following actions, one at a time until the problem is resolved:

   a. Ensure that all of the power cords are fully seated in the power supplies.

   b. Ensure that all of the power cords are fully seated in the power distribution units (PDUs) or wall outlets.

   c. If the power cords are plugged into PDUs, ensure that the PDUs are turned on.

   d. Ensure that all of the power cords are plugged into PDUs or wall outlets that are supplying electricity.

   e. Replace the power cords.

   f. Replace the power supplies.

   • If your system is a 9183-22X, go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.

   This ends the procedure.

4. Is the amber LED of a power supply on solid and is the amber system attention LED on the front of the system on solid?

If	Then
Yes:	Continue with the next step.
No:	Go to "Contacting IBM service and support" on page 18. **This ends the procedure.**

5. Perform the following actions, one at a time until the problem is resolved:

   a. Resolve any serviceable alerts that are in the event log. Go to Resolving a hardware problem.

   b. Ensure that the power supply is fully seated in the system.

   c. Ensure that the power supply fan is not blocked.

   d. Replace the power supply.

   • If your system is a 9183-22X, go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.

   This ends the procedure.

Resolving a system firmware boot failure

Learn how to identify the service action that is needed to resolve a failure while booting your system firmware.

Procedure

1. After you press the power button, did the system turn on but fail to display the Petitboot menu?

If	Then
Yes:	Continue with the next step.
No:	Continue with step "6" on page 5.

2. Does the baseboard management controller (BMC) respond to commands?

Note: To determine whether the BMC responds to commands, run the following OpenBMC tool command:

```
openbmctool -U <username> -P <password> -H <BMC IP address or BMC host name> chassis power
status
```

If	Then
Yes:	Continue with the next step.
No:	Continue with step 4.

3. Complete the following actions:

   a. Update the system firmware. For instructions, see Getting fixes.

   b. Check the system event logs. For instructions, see "Identifying a service action by using system event logs" on page 16. Then, continue with step 6.

4. Disconnect the power cords from the system for 30 seconds. Reconnect the power cords, wait 5 minutes, and then continue with the next step.

5. Does the baseboard management controller (BMC) respond to commands?

   Note: To determine whether the BMC responds to commands, run the following OpenBMC tool command:

```
openbmctool -U <username> -P <password> -H <BMC IP address or BMC host name> chassis power
status
```

If	Then
Yes:	Update the system firmware. For instructions, see Getting fixes. **This ends the procedure.**
No:	Replace the system backplane. Go to 9183-22X to identify the physical location and the removal and replacement procedure. **This ends the procedure.**

6. Power off the system and disconnect all AC power cords for 30 seconds. Then, reconnect the AC power cords and power on the system. Does the system boot successfully?

If	Then
Yes:	**This ends the procedure.**
No:	Go to "Resolving a hardware problem" on page 7. **This ends the procedure.**

Resolving a VGA monitor problem

Learn how to identify the service action that is needed to resolve a video graphics array (VGA) monitor problem.

Procedure

1. Is the system powered on and is the VGA monitor connected to the VGA display port, but no video is displayed?

If	Then
Yes:	Continue with the next step.
No:	Power on the system. **This ends the procedure.**

2. Complete the following steps, one at a time until the problem is resolved:

   a) Ensure that the network image that is specified is a valid boot image.

   b) Ensure that the VGA cable is properly seated to the server port and to the monitor port.

c) Verify that your monitor and your VGA cable are working properly by testing them on a system that is known to be working properly. If the monitor or the VGA cable does not work properly, replace it.

d) Verify that the system is powered on by activating a serial over LAN (SOL) session through the baseboard management controller (BMC). If the system is not active, go to "Resolving a system firmware boot failure" on page 4.

e) Replace the system backplane.

- If your system is a 9183-22X , go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.

This ends the procedure.

Resolving an operating system boot failure

Learn how to identify the service action that is needed to resolve a failure while booting your operating system.

Procedure

1. Was the system recently installed, serviced, moved, or upgraded?

If	Then
Yes:	Ensure that all cables are properly seated in the connection path to the designated boot device. **This ends the procedure.**
No:	Continue with the next step.

2. Are you booting the operating system from a network location?

If	Then
Yes:	Continue with the next step.
No:	Continue with step "4" on page 6.

3. Complete the following actions, one at a time until the problem is resolved:

   a. Ensure that a problem does not exist with the connection to the network location.

   b. Ensure that the adapter has a valid IP address for the network.

   c. Replace the network adapter.

   - If your system is a 9183-22X, go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.

4. Petitboot displays all recognized bootable images to use by default. Is the boot image recognized by Petitboot?

If	Then
Yes:	Continue with the next step.
No:	Select the Petitboot menu option to refresh the boot images. If the problem persists, go to "Resolving a storage device problem" on page 11. **This ends the procedure.**

5. Does an operating system error occur during the boot?

If	Then
Yes:	Recover the operating system with the tools provided for the operating system. If that does not resolve the problem, reinstall the operating system. **This ends the procedure.**
No:	Reinstall the operating system. **This ends the procedure.**

Resolving a hardware problem

Learn how to identify the service action that is needed to resolve a hardware problem.

Procedure

1. If you have not already done so, manually boot the system.
2. Go to "Identifying a service action by using system event logs" on page 16. Then, continue with the next step.
3. Was a service action identified?

If	Then
Yes:	Continue with the next step.
No:	Go to step "5" on page 7.

4. Did the service action fix the problem?

If	Then
Yes:	**This ends the procedure.**
No:	Go to step "5" on page 7.

5. Go to "Resolving a GPU, PCIe adapter, or device problem" on page 7. Then, continue with the next step.
6. Was a service action identified?

If	Then
Yes:	Continue with the next step.
No:	Go to "Collecting diagnostic data" on page 18. Then, go to "Contacting IBM service and support" on page 18. **This ends the procedure.**

7. Did the service action fix the problem?

If	Then
Yes:	**This ends the procedure.**
No:	Go to "Collecting diagnostic data" on page 18. Then, go to "Contacting IBM service and support" on page 18. **This ends the procedure.**

Resolving a GPU, PCIe adapter, or device problem

Learn how to access log files, information to identify types of events, and a list of potential problems and service actions.

Procedure

1. Are all of the adapters in the system missing or failed?

If	Then
Yes:	Replace the system backplane. • If your system is a 9183-22X, go to "9183-22X locations" on page 21 to identify the physical location and the removal and replacement procedure.
No:	Continue with the next step.

2. To identify the correct service procedure to perform by using operating system log information, complete the following steps:

   a) Log in as the root user.

b) To display the operating system logs, type `dmesg` and press Enter.
3. Scan the operating system logs that occurred around the time that the problem started for the first occurrence of keywords, such as fail, failure, or failed. When you find a keyword that accompanies one or more of the resource names in the following table, a service action is required. Use the following table to determine the service procedure to perform for your type of problem.

Table 1. Resource names, examples, and service procedures for different types of operating system logs.

Resource name	Example of a log requiring a service action	Type of problem	Service procedure
eth1, eth2, eth3, enP*xxxxx*, where *xxxxx* indicates the network port.	`Failed to re-initialize device`	Network	Go to "Resolving a network adapter problem" on page 9.
mlx5_core	`Link Down health_care: handling bad device here`	Network	Go to "Resolving a network adapter problem" on page 9.
tg3	`PCI I/O error detected. Link is Down`	Network	Go to "Resolving a network adapter problem" on page 9.
NVRM	`aborting RmInitAdapter failed!`	Graphics	Go to "Resolving a graphics processing unit problem" on page 10.
nvidia-nvlink	`IBMNPU: NPU FENCE detected, machine power cycle required`	Graphics	Go to "Resolving a graphics processing unit problem" on page 10.
nvme	`Failed status: ffffffff, reset controller`	NVMe Flash adapter	Go to "Resolving an NVMe Flash adapter problem" on page 12.
sda, sdb, sdc	`FAILED Result`	Storage	Go to "Resolving a storage device problem" on page 11.

Resource name	Example of a log requiring a service action	Type of problem	Service procedure
EEH	`Detected error on PHB#xxx`, where *xxx* is the PHB number.	PCIe bus or adapter	Resolve any device driver errors that are related to I/O and that occurred near the time of this operating system log entry.
	`xxx has failed 6 times in the last hour and has been permanently disabled`, where *xxx* is the PCI bus number.	PCIe bus or adapter	Ensure that the correct device drivers are properly installed for the device. If the problem persists, replace the adapter in the PCIe slot that is specified in the operating system log entry.

Table 1. Resource names, examples, and service procedures for different types of operating system logs. (continued)

Resolving a network adapter problem

Learn about the possible problems and service actions that you can perform to resolve a network adapter problem.

About this task

Note: To determine the location of the PCIe adapter, see .

Table 2. Network adapter problems and service actions

Problem	Service action
System unable to find adapter	1. Verify that the adapter is properly seated in a compatible slot. 2. Install the adapter in a different compatible slot. 3. Verify that the drivers for the adapter are installed. 4. Verify that the most recent firmware is installed on the system. Otherwise, install the most recent firmware if it is not already installed. 5. Restart the system. 6. Replace the adapter. 7. Replace the system backplane. 8. Replace the central processing unit (CPU).

Table 2. Network adapter problems and service actions (continued)

Problem	Service action
Adapter stops working suddenly	1. If the system was recently installed, moved, serviced, or upgraded, verify that the adapter is seated properly and all associated cables are correctly connected. 2. Inspect the PCIe socket and verify that there is no dirt or debris in the socket. 3. Inspect the card and verify that it is not physically damaged. 4. Verify that all cables are properly seated and are not physically damaged. If you recently added one or more new adapters, remove them and then test to determine whether the failing adapter is functioning properly again. If the network adapter is functioning again, review the IBM support tips to confirm that there are no PCI address, driver, or firmware conflicts. Then, reinstall the new adapters again one at a time until all adapters function properly. 5. Replace the adapter. 6. Replace the system backplane. 7. Replace the CPU.
Link indicator light on the adapter is off	1. Verify that the cable functions properly by testing it with a known working connection. 2. Verify that the port or ports on the switch are enabled and functional. 3. Verify that the switch and adapter are compatible. 4. Replace the adapter.
Link light on the adapter is on, but there is no communication from the adapter	1. Verify that the most recent driver is installed, or install the most recent driver if it is not already installed. 2. Verify that the adapter and its link have compatible settings, such as speed and duplex configuration.
Other problems	For information about adapter diagnostics, see Supporting diagnostics. For information about adapter user information, see "User guides for GPUs and PCIe adapters" on page 16.

Resolving a graphics processing unit problem

Learn about the possible problems and service actions that you can perform to resolve a graphics processing unit (GPU) problem.

About this task

Note: To determine the location of the GPU, see "Identifying the location of the GPU" on page 14.

Table 3. GPU problems and service actions for the 9183-22X	
Problem	**Service action**
System unable to find GPU	1. Verify that the GPU is properly seated in a compatible slot. 2. Install the GPU in a different compatible slot. 3. Verify that the drivers for the GPU are installed. 4. Verify that the most recent firmware is installed on the system. Otherwise, install the most recent firmware if it is not already installed. 5. Restart the system. 6. Replace the GPU. 7. Replace the system backplane. 8. Replace the central processing unit (CPU).
GPU stops working suddenly	1. If the system was recently installed, moved, serviced, or upgraded, verify that the GPU is seated properly and all associated cables are correctly connected. 2. Inspect the PCIe socket and verify that there is no dirt or debris in the socket. 3. Inspect the GPU and verify that it is not physically damaged. 4. Verify that all cables are properly seated and are not physically damaged. If you recently added one or more new GPUs or adapters, remove them and then test to determine whether the failing GPU is functioning properly again. If the GPU is functioning again, review the IBM support tips to confirm that there are no PCI address, driver, or firmware conflicts. Then, reinstall the new GPUs and adapters again one at a time until all adapters function properly. 5. Replace the GPU. 6. Replace the system backplane. 7. Replace the CPU.
Other problems	For information about adapter diagnostics, see Supporting diagnostics. For information about adapter user information, see "User guides for GPUs and PCIe adapters" on page 16.

Resolving a storage device problem

Learn about the possible problems and service actions that you can perform to resolve a storage device problem.

About this task

Note: To determine the location of the storage device, see "Identifying the location of the storage device" on page 15.

Table 4. Storage device problems and service actions	
Problem	**Service action**
System unable to find a storage device that is at the front of the system	1. If the system was recently installed, moved, serviced, or upgraded, verify that the device is seated and installed properly. 2. Verify that the device is compatible with your system. 3. Verify that all internal cables are properly seated and are not physically damaged. 4. Verify that the most recent firmware is installed on the system. Otherwise, install the most recent firmware if it is not already installed. 5. Replace the drive. 6. Replace the cable. 7. Replace the disk drive and fan card.
Drive stops working suddenly	1. Verify that all internal cables are properly seated and are not physically damaged. 2. Check the system logs to verify whether the system detected a problem. 3. Replace the drive. 4. Replace the cable.
Other problems	Check the messages and resolve any other problems that were detected. Then, test the drive again. If the drive continues not to function, refer to the documentation for the drive.

Resolving an NVMe Flash adapter problem

Learn about the possible problems and service actions that you can perform to resolve a Non-Volatile Memory Express (NVMe) Flash adapter problem.

About this task

If you suspect a problem with an NVMe Flash adapter, use the following table to determine the service action to perform.

Note: To determine the location of the NVMe Flash adapter, see .

Table 5. NVMe Flash adapter problems and service actions	
Problem	**Service action**
System is unable to find the NVMe Flash adapter	1. If the NVMe Flash adapter has an amber LED that is flashing or is on solid, replace the adapter. Go to "9183-22X locations" on page 21 to identify the physical location and removal and replacement procedure. **Important:** Before you remove an NVMe Flash adapter, ensure that you back up all data on the adapter or the array that contains the adapter. After you replace the adapter, restore the data. 2. If the system was recently installed, moved, serviced, or upgraded, verify that the NVMe Flash adapter is seated and installed properly. 3. Verify that the NVMe Flash adapter is compatible with the system. 4. Verify that the most recent firmware is installed on the system. Otherwise, install the most recent firmware if it is not already installed. 5. Replace the NVMe Flash adapter. Go to "9183-22X locations" on page 21 to identify the physical location and removal and replacement procedure. **Important:** Before you remove an NVMe Flash adapter, ensure that you back up all data on the adapter or the array that contains the adapter. After you replace the adapter, restore the data.
NVMe Flash adapter stops working suddenly	1. If the NVMe Flash adapter has an amber LED that is flashing or is on solid, replace the adapter. Go to "9183-22X locations" on page 21 to identify the physical location and removal and replacement procedure. **Important:** Before you remove an NVMe Flash adapter, ensure that you back up all data on the adapter or the array that contains the adapter. After you replace the adapter, restore the data. 2. Check the system logs to verify whether the system detected a problem. 3. Replace the NVMe Flash adapter. Go to "9183-22X locations" on page 21 to identify the physical location and removal and replacement procedure. **Important:** Before you remove an NVMe Flash adapter, ensure that you back up all data on the adapter or the array that contains the adapter. After you replace the adapter, restore the data.
Other problems	1. Check for and resolve any nvme*X* entries in the operating system log, where nvme*X* is the resource name of the NVMe Flash adapter. Then, test the NVMe Flash adapter again. 2. Ensure that the latest I/O adapter firmware is installed. For instructions, see Getting firmware fixes for IBM I/O adapters by using Fix Central. 3. Ensure that you have the latest device driver service updates by installing the latest Linux® distribution fixes. 4. Type the following command and press Enter: nvme smart-log /dev/nvme*X*, where nvme*X* is the resource name of the NVMe Flash adapter. Check for problems with the critical warning, temperature, available spare, percentage used, power cycles, or power on hours fields. **Note:** For more information about nvme commands, type man nvme and press Enter.

Identifying the location of the PCIe adapter by using the slot number

The error message provides information to help you to determine the location of the PCIe adapter.

About this task

For example, the log might contain an error message similar to the following text:

```
[131779.752714] EEH: PHB#0 failure detected, location: Slot5
```

Replace the PCIe adapter. Go to "9183-22X locations" on page 21 and use the slot number information in the operating system log to identify the physical location and the removal and replacement procedure.

Identifying the location of the GPU

The error message provides information to help you to determine the location of the graphics processing unit (GPU).

Procedure

1. Does the operating system log contain the slot number? For example, the log might contain an error message similar to the following text:

   ```
   EEH: PHB#0 failure detected, location: Slot5
   ```

If	Then
Yes:	Replace the GPU. Go to "9183-22X locations" on page 21 and use the slot number information to identify the physical location and the removal and replacement procedure. **This ends the procedure.**
No:	Continue with the next step.

2. Does the operating system log contain an error message with only PCI bus information (for example, `0002:01:00.0`)?

If	Then
Yes:	Continue with the next step.
No:	Go to "Collecting diagnostic data" on page 18. Then, go to "Contacting IBM service and support" on page 18. **This ends the procedure.**

3. You can determine the GPU slot information by using the **lshw** command. To determine the GPU slot, complete the following steps:

   a) Record the PCI bus information that is in the error message.

   b) Log in to the operating system with root authority.

   c) Type the following command and press Enter:

   ```
   lshw -class display
   ```

   d) Determine the GPU slot that is associated with the PCI bus information that you recorded in step a.

   e) Replace the GPU. Go to "9183-22X locations" on page 21 and use the slot number information to identify the physical location and the removal and replacement procedure. **This ends the procedure.**

Identifying the location of the NVMe Flash adapter

Use this procedure to identify the location of a Non-Volatile Memory Express (NVMe) Flash adapter.

Procedure

1. Does the operating system log contain the slot number? For example, the log might contain an error message similar to the following text:

```
[131779.752714] EEH: PHB#0 failure detected, location: Slot1
```

If	Then
Yes:	Replace the adapter. Go to "9183-22X locations" on page 21 and use the slot number information to identify the physical location and the removal and replacement procedure. **This ends the procedure.**
No:	Continue with the next step.

2. Locate the NVMe Flash adapter by using the PCI address:

   a) The operating system log contains information about the NVMe Flash adapter in the form of a PCI address. Record the PCI address information for the NVMe Flash adapter that failed. For example, in the operating system log message `nvme 0006:01:00.0: Failed status: ffffffff, reset controller`, the PCI address of the failing NVMe Flash adapter is 0006:01:00.0.

   b) At the command line, type `lscfg -vl pciaddress`, where `pciaddress` is the NVMe Flash adapter information that you recorded in step 2.a. Then, press Enter.

   c) Record the slot number information that is in the location code field.

   d) Replace the adapter. Go to "9183-22X locations" on page 21 and use the slot number information to identify the physical location and the removal and replacement procedure. **This ends the procedure**.

Identifying the location of the storage device

Use this procedure to identify the location of a storage device.

Procedure

1. Is there a disk drive or solid-state drive with an amber fault LED turned on solid?

If	Then
Yes:	Continue with step "2" on page 15.
No:	Continue with step "3" on page 15.

2. Replace the disk drive or solid-state drive.

   - If your system is a 9183-22X, go to "9183-22X locations" on page 21 to identify the removal and replacement procedure. **This ends the procedure.**

3. The storage device location is determined in the drive removal and replacement procedures for your system. Use the following table to find the correct removal and replacement procedure. **This ends the procedure.**

Table 6. Drive removal and replacement procedures	
System	**Drive removal and replacement procedures**
9183-22X	See Removing and replacing a disk drive in the 9183-22X.

User guides for GPUs and PCIe adapters

Use this information to find the user guide for your graphics processing unit (GPU) or PCIe adapter.

About this task

Use the following table to find the user guide for the GPU or PCIe adapter that you are using.

Table 7. GPU and PCIe adapter user guides	
Name	**User guide**
Broadcom (LSI)	Broadcom website (http://www.broadcom.com)
Marvell	Marvell website (http://www.marvell.com/storage/system-solutions/sata-controllers/)
Mellanox	Mellanox Technologies website (http://mymellanox.force.com/support/VF_SerialSearch)
NVIDIA	NVIDIA website (http://www.nvidia.com)

Identifying a service action by using system event logs

Use the OpenBMC tool to examine system event logs (SELs) to identify a service action.

Procedure

1. From a system that has the OpenBMC tool installed, type the following command and press Enter:

   ```
   openbmctool -U <username> -P <password> -H <BMC IP address or BMC host name>
   sel print
   ```

2. Is there an **Active Alerts** section displayed in the output of the command?

If	Then
Yes:	Continue with the next step.
No	No service action is required. **This ends the procedure.** **Note:** Alerts that are displayed in the **Historical Alerts** section do not require service.

3. Is there an entry in the **Active Alerts** section with a value of **Yes** in the **Serviceable** column?

If	Then
Yes:	Continue with the next step.
No	No service action is required. **This ends the procedure.** **Note:** Alerts with a value of **No** that are displayed in the **Serviceable** column do not require service.

4. Starting with the first entry in the **Active Alerts** section with a value of **Yes** in the **Serviceable** column, complete the following steps until all entries are resolved:

   a. Record the log number that is displayed in the **Entry** column.

   b. Record the FQPSP*xxxxxxx* value that is displayed in the **ID** column. Then, go to FQPSP*xxxxxxx* Event Codes and complete the service action that is indicated for the FQPSP*xxxxxxx* event code.

   c. After the service action is complete and the problem is resolved, type the following command and press Enter:

   ```
   openbmctool -U <username> -P <password> -H <BMC IP address or BMC host
   name> sel resolve -n x
   ```
   , where *x* is the log number that you recorded in step "4.a" on page 16.

This ends the procedure.

Verifying a repair

Learn how to verify hardware operation after you make repairs to the system.

Procedure

1. Power on the system.
2. Did you replace a graphics processing unit (GPU), PCIe adapter, disk drive, or solid-state drive?

If	Then
Yes:	Go to step "5" on page 17.
No:	Continue with the next step.

3. Scan the system event logs (SELs) for serviceable events that occurred after system hardware was replaced. For information about SELs that require a service action, see "Identifying a service action by using system event logs" on page 16.
4. Did any serviceable SEL events occur after hardware was replaced?

If	Then
Yes:	The problem is not resolved. Go to "Identifying a service action by using system event logs" on page 16 and complete the service actions indicated. **This ends the procedure.**
No:	The problem is resolved. **This ends the procedure.**

5. Use the following table to determine the verification action to complete:

Table 8. Determining a verification action for GPUs, PCIe adapters, and devices	
Adapter type	**Verification action**
Devices that are not controlled by a RAID adapter	Complete the following steps: a. Install the smartmontools utility. If you have the Red Hat Enterprise Linux operating system, type `yum install smartmontools` at the command prompt of the operating system and press Enter. If you have the Ubuntu Linux operating system, type `apt-get install smartmontools` at the command prompt of the operating system and press Enter. b. At the command prompt of the operating system, type `smartctl --all /dev/sdx`, where *x* is the letter that is associated with the drive. c. Verify that the SMART health assessment passed.
GPU	Complete the following steps: a. Type `nvidia-smi -L` at the command prompt of the operating system and press Enter. Verify that the GPU is listed. b. Type `nvidia-smi -q` at the command prompt of the operating system and press Enter. Verify that no errors are listed.

Table 8. Determining a verification action for GPUs, PCIe adapters, and devices *(continued)*	
Adapter type	**Verification action**
Network adapter	Complete the following steps: a. At the command prompt of the operating system, type `ethtool ethx`, where *x* is the number of the physical port that you are testing. Verify that the connection speed that is indicated in the output is correct. b. Perform a ping test to verify the network connectivity.

Collecting diagnostic data

Learn how to collect diagnostic data to send to IBM service and support.

About this task

To collect diagnostic data, complete the following steps:

Procedure

1. Is the operating system available?

If	Then
Yes:	Continue with step "2" on page 18.
No:	Continue with step "3" on page 18.

2. To collect diagnostic data from the operating system, complete the following steps:

   a) Log in as root user.

   b) At the command prompt, type `sosreport` and press Enter.

   c) You are prompted for additional information. When the command is complete, the location of the output file is displayed. Note the location of the output file. Then, continue with the next step.

3. To collect system event logs, type the following command and press Enter:

```
openbmctool -U <username> -P <password> -H <BMC IP address or BMC host name>
collect_service_data
```

4. Send the data that you collected during this procedure to IBM service and support. **This ends the procedure**.

Contacting IBM service and support

You can contact IBM service and support by telephone or through the IBM Support Portal.

Before you contact IBM service and support, go to "Beginning troubleshooting and problem analysis" on page 1 and complete all of the service actions indicated. If the service actions do not resolve the problem, or if you are directed to contact support, go to "Collecting diagnostic data" on page 18. Then, use the information below to contact IBM service and support.

Customers in the United States, United States territories, or Canada can place a hardware service request online. To place a hardware service request online, go to the IBM Support Portal (http://www.ibm.com/support/entry/portal/product/power/scale-out_lc).

For up-to-date telephone contact information, go to the Directory of worldwide contacts website (www.ibm.com/planetwide/).

Table 9. Service and support contacts	
Type of problem	**Call**
• Advice • Migrating • "How to" • Operating • Configuring • Ordering • Performance • General information	• 1-800-IBM-CALL (1–800–426–2255) • 1-800-IBM-4YOU (1–800–426–4968)
Software: • Fix information • Operating system problem • IBM application program • Loop, hang, or message Hardware: • IBM system hardware broken • Hardware reference code • IBM input/output (I/O) problem • Upgrade	1-800-IBM-SERV (1–800–426–7378)

Finding parts and locations

Locate physical part locations and identify parts in system diagrams.

Locate the FRU

Use graphics and tables to locate the field-replaceable unit (FRU) and identify the FRU part number.

9183-22X locations

Use this information to find the location of a field-replaceable unit (FRU) in the system unit.

Rack views

The following diagrams show field-replaceable unit (FRU) layouts in the system. Use these diagrams with the following tables.
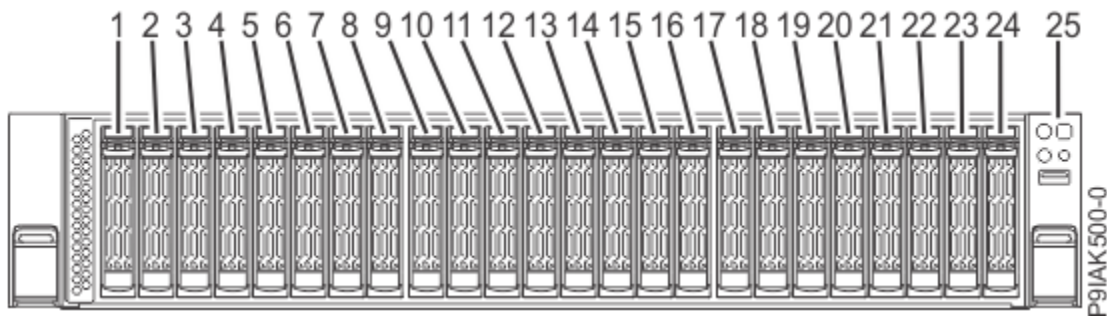

Figure 1. Front view

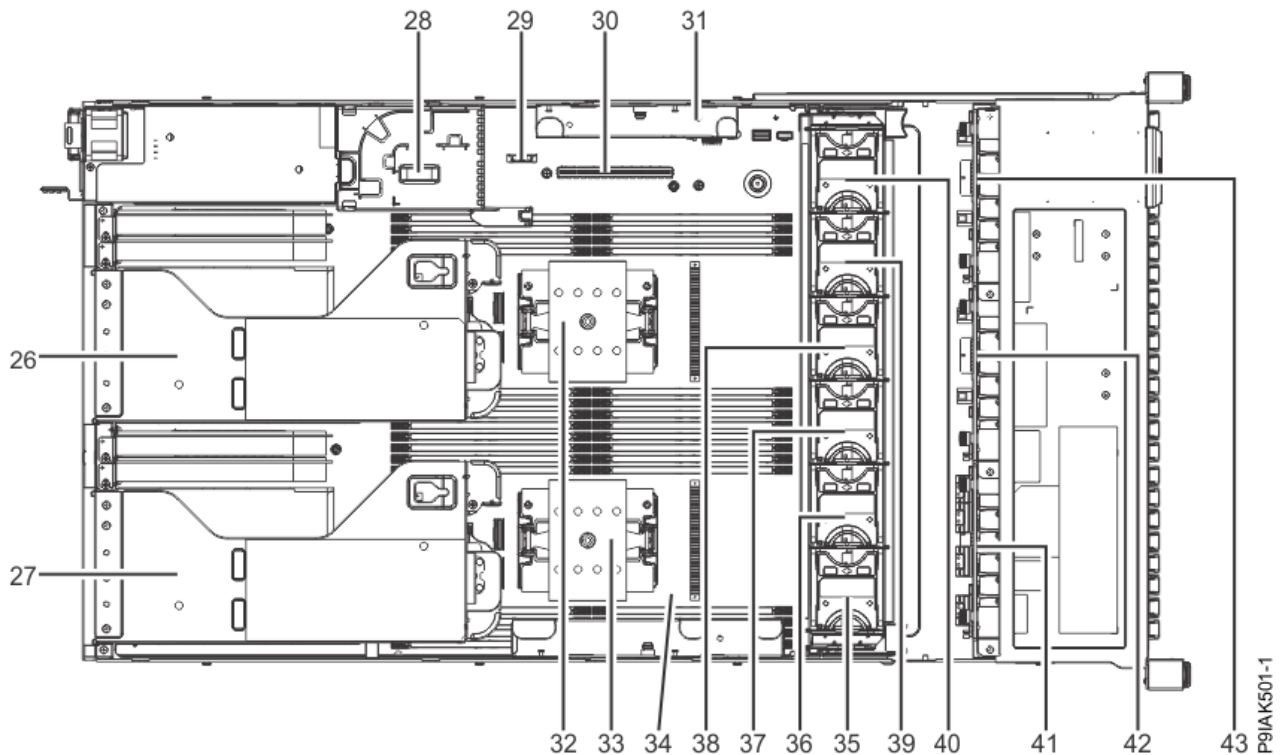| Table 10. Front view locations		
Index number	**FRU description**	**FRU removal and replacement procedures**
1	Drive 0	See Removing and replacing a hard disk drive, solid-state drive, or NVMe drive in the 9183-22X system.
2	Drive 1	
3	Drive 2	
4	Drive 3	
5	Drive 4	
6	Drive 5	
7	Drive 6	
8	Drive 7	
9	Drive 8	
10	Drive 9	
11	Drive 10	
12	Drive 11	
13	Drive 12	
14	Drive 13	
15	Drive 14	
16	Drive 15	
17	Drive 16	
18	Drive 17	
19	Drive 18	
20	Drive 19	
21	Drive 20	
22	Drive 21	
23	Drive 22	
24	Drive 23	
25	Power switch and cables	See Removing and replacing the power switch and cables in the 9183-22X system.

Figure 2. Top view

Table 11. Top view locations		
Index number	**FRU description**	**FRU removal and replacement procedures**
26	Riser 0	See Removing and replacing PCIe risers in the 9183-22X system.
27	Riser 1	
28	Power distribution board	See Removing and replacing the power distribution board in the 9183-22X system.
29	Time-of-day battery	See Removing and replacing the time-of-day battery in the 9183-22X system.
30	Reserved	
31	Trusted platform module	See Removing and replacing the trusted platform module in the 9183-22X system.
32	CPU 0	See Removing and replacing a system processor module in the 9183-22X system.
33	CPU 1	
34	System backplane	See Removing and replacing the system backplane in the 9183-22X system.

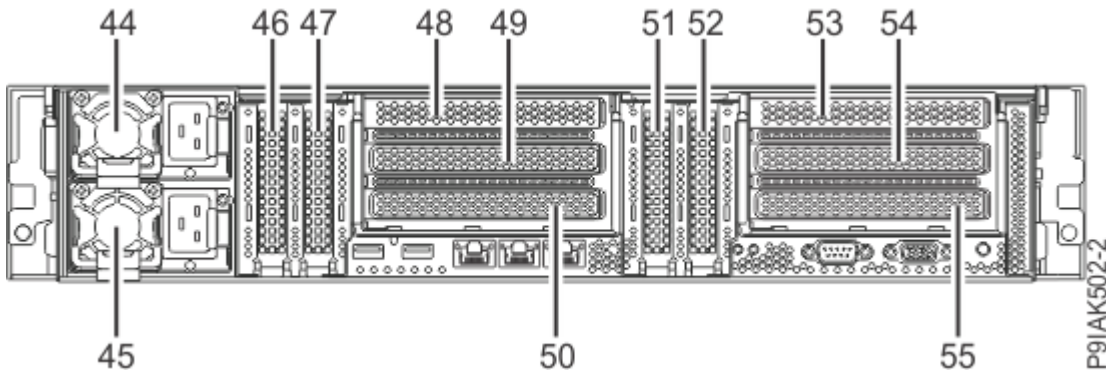| Table 11. Top view locations (continued)		
Index number	FRU description	FRU removal and replacement procedures
35	Fan 0	See Removing and replacing fans in the 9183-22X system.
36	Fan 1	
37	Fan 2	
38	Fan 3	
39	Fan 4	
40	Fan 5	
41	Drive backplane 0	See Removing and replacing drive backplanes in the 9183-22X system.
42	Drive backplane 1	
43	Drive backplane 2	

Figure 3. Rear view

Table 12. Rear view locations		
Index number	FRU description	FRU removal and replacement procedures
44	Power supply unit 0 (PSU 0)	See Removing and replacing a power supply in the 9183-22X system.
45	Power supply unit 1 (PSU 1)	
46	PCIe adapter 1 (Slot1)	See Removing and replacing PCIe adapters in the 9183-22X system.
47	PCIe adapter 2 (Slot2)	
48	PCIe adapter 3 (Slot3)	
49	PCIe adapter 4 (Slot4)	
50	PCIe adapter 5 (Slot5)	
51	PCIe adapter 6 (Slot6)	
52	PCIe adapter 7 (Slot7)	
53	PCIe adapter 8 (Slot8)	
54	PCIe adapter 9 (Slot9)	
55	PCIe adapter 10 (Slot10)	

Memory locations

The following diagram shows memory DIMMs and their corresponding field-replaceable unit (FRU) layouts in the system. Use this diagram with the following table.

Figure 4. Memory locations

Table 13. Memory locations		
Index number	**FRU description**	**FRU removal and replacement procedures**
56	DIMM 0	See Removing and replacing memory in the 9183-22X system.
57	DIMM 1	
58	DIMM 2	
59	DIMM 3	
60	DIMM 4	
61	DIMM 5	
62	DIMM 6	
63	DIMM 7	
64	DIMM 8	
65	DIMM 9	
66	DIMM 10	
67	DIMM 11	
68	DIMM 12	
69	DIMM 13	
70	DIMM 14	
71	DIMM 15	
72	DIMM 16	
73	DIMM 17	
74	DIMM 18	
75	DIMM 19	
76	DIMM 20	
77	DIMM 21	
78	DIMM 22	
79	DIMM 23	
80	DIMM 24	
81	DIMM 25	
82	DIMM 26	
83	DIMM 27	
84	DIMM 28	
85	DIMM 29	
86	DIMM 30	
87	DIMM 31	

9183-22X parts

Use this information to find the field-replaceable unit (FRU) part number.
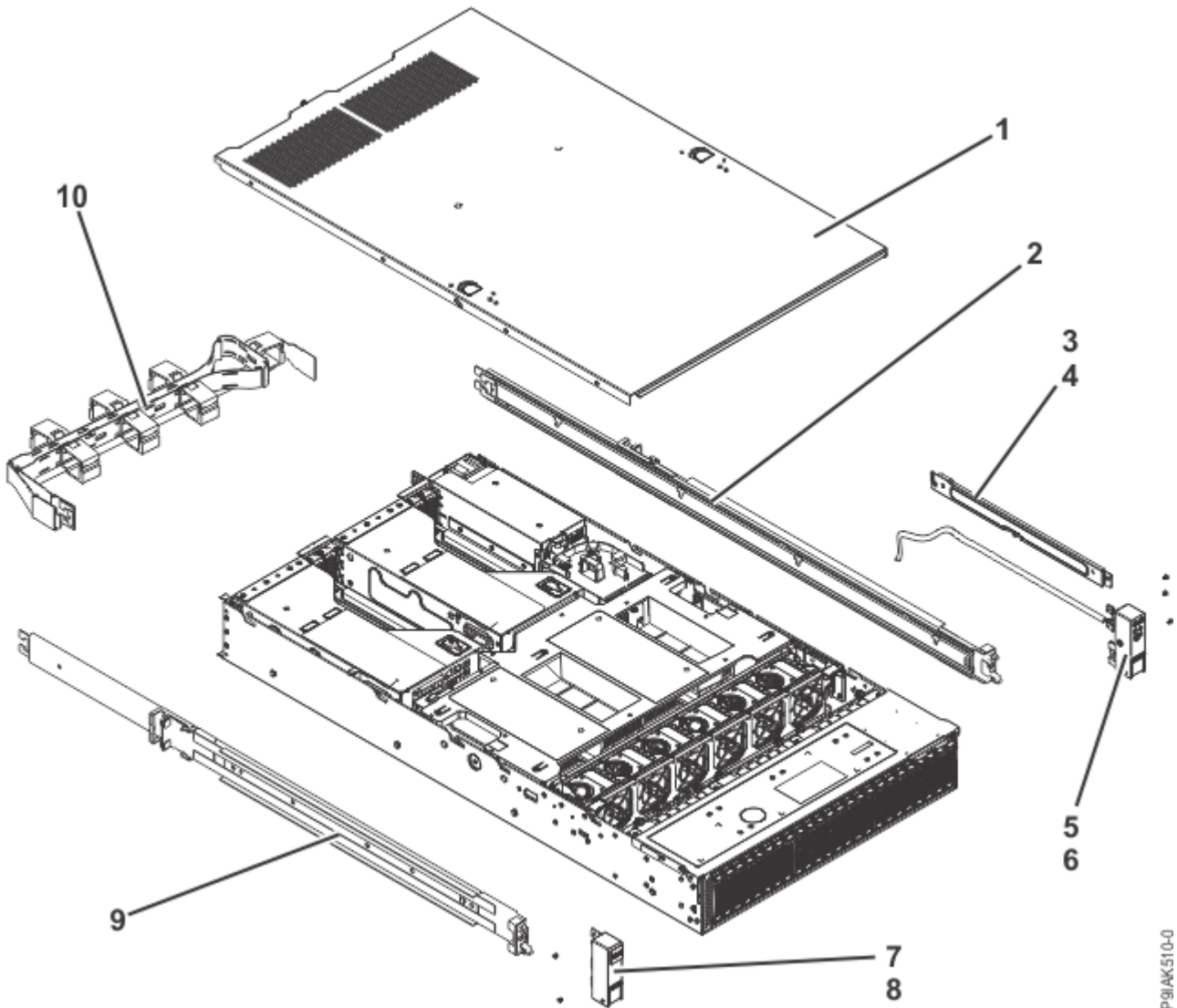
Rack final assembly

Figure 5. Rack final assembly

Index number	Part number	Units per assembly	Description
Table 14. Rack final assembly part numbers			
1		1	Top access-cover assembly
2	01EM868	1	Slide rail kit - contains left and right slide rails and attaching screws
3		1	Side channel
4		2	Screws

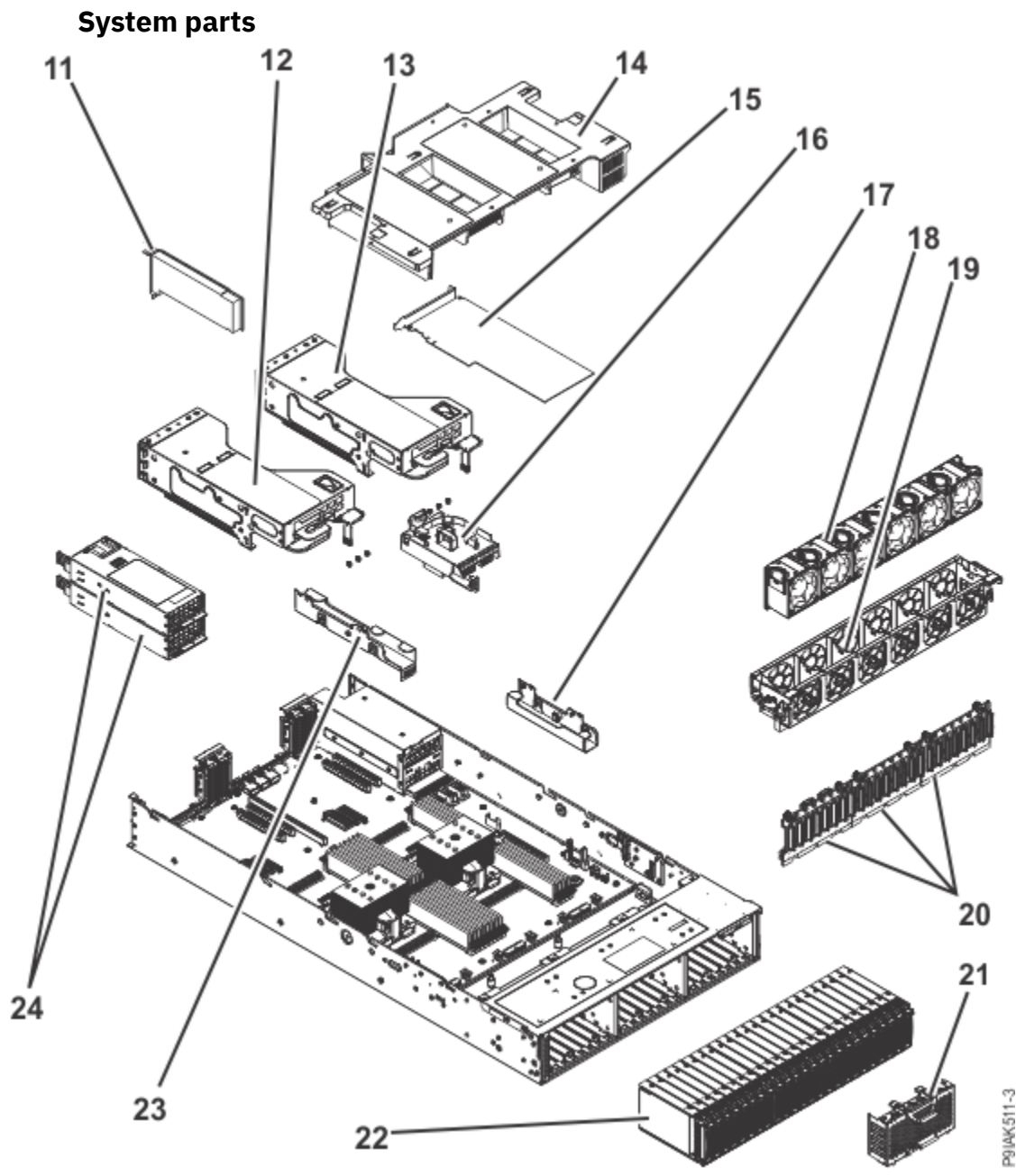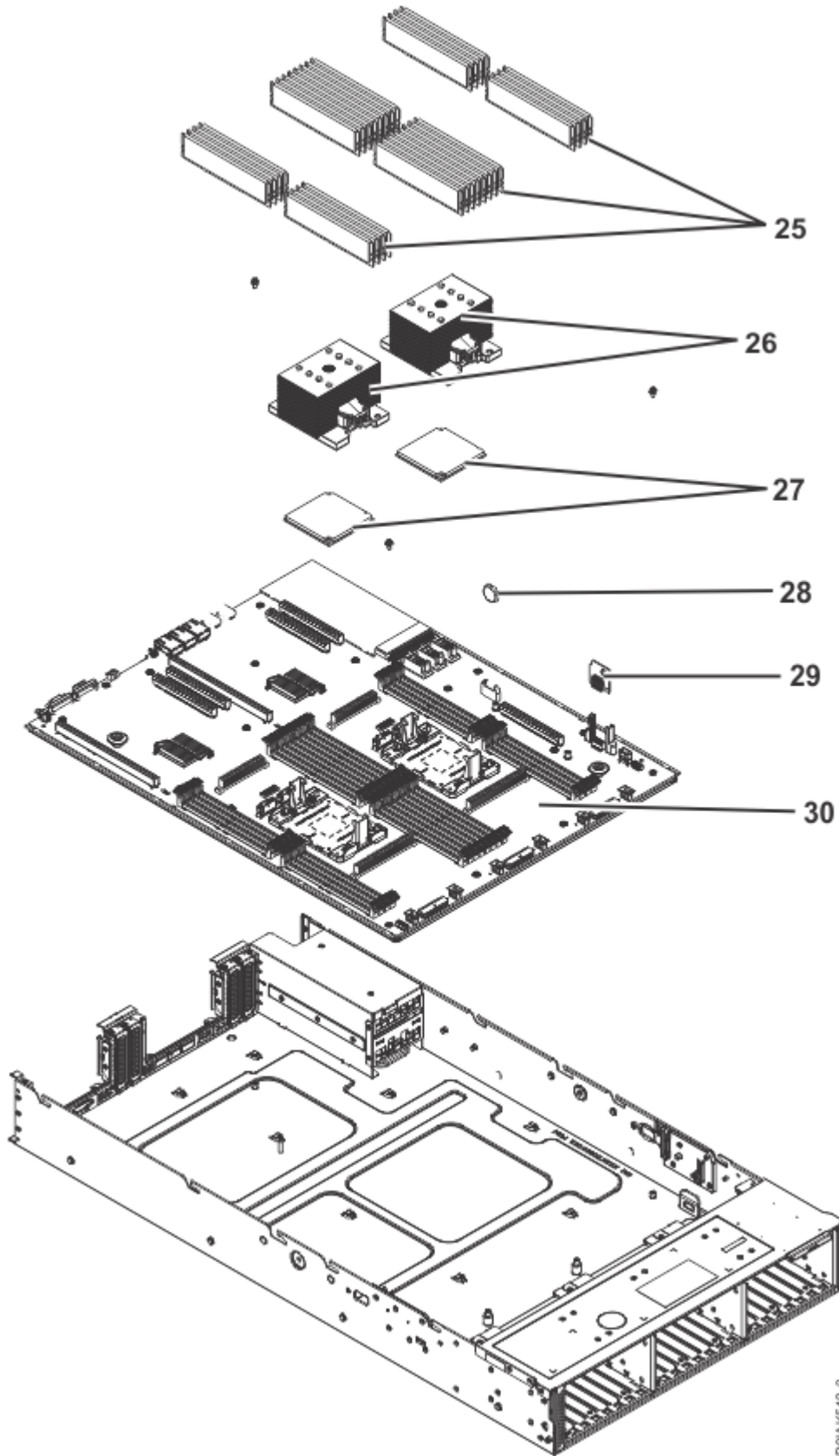| Index number	Part number	Units per assembly	Description
5	01EM895	1	Power switch and cables kit (includes power switch, power switch cable, USB cable, left Electronic Industries Association (EIA) bracket and right EIA bracket)
6		2	Screws
7	01EM895	1	Left EIA bracket
8		2	Screws
9	01EM868	1	Slide rail kit - contains left and right slide rails and attaching screws
10	01EM869	1	Cable management arm assembly

Table 14. Rack final assembly part numbers (continued)

System parts

Figure 6. System parts

Table 15. System parts			
Index number	**Part number**	**Units per assembly**	**Description**
11		0-4	PCI adapters. Use the feature type of the adapter to find the FRU number in PCIe adapter information by feature type for the 9183-22X system.
12	01EM888	1	PCIe riser (riser 1 for PCIe adapter slots 8, 9, and 10) **Note:** For more information about riser locations, see 9183-22X locations.

Table 15. System parts (continued)			
Index number	**Part number**	**Units per assembly**	**Description**
13	01EM906	1	PCIe riser (riser 0 for PCIe adapter slots 3, 4, and 5) **Note:** For more information about riser locations, see 9183-22X locations.
14	01EM841	1	Air baffle
15		0-6	PCI adapters. Use the feature type of the adapter to find the FRU number in PCIe adapter information by feature type for the 9183-22X system.
16	01EM892	1	Power distribution board
17	01EM899	1	Cable holder (left)
18	01EM839	6	Fan
19	01EM838	1	Fan cage assembly
20	01EM891	0-3	SAS and SATA drive backplane (each supports 8 SAS or SATA drives)
21	01EM852	0-3	8-bay filler for drives
22	01EM843	0-24	Drive holder (carrier and filler)
22	01LU995	0-24	600 GB SAS disk drive
22	01LU996	0-24	1.2 TB SAS disk drive
22	01LU997	0-24	2.4 TB SAS disk drive
22	02YC527	0-24	240 GB SATA solid-state drive
22	02YC528	0-24	960 GB SATA solid-state drive
22	02YC529	0-24	1.92 TB SATA solid-state drive
22	02YC530	0-24	3.84 TB SATA solid-state drive
22	02YC531	0-24	3.84 TB SAS solid-state drive
23	01EM900	1	Cable holder (right)
24	01EM867	2	Power supply

Additional system parts

Figure 7. Additional system parts

Table 16. Additional system parts			
Index number	Part number	Units per assembly	Description
25	78P4197	4, 8, 12, 16, 24, or 32	16 GB, 2666 Mbps DDR4 RDIMM
25	78P4198	4, 8, 12, 16, 24, or 32	32 GB, 2666 Mbps DDR4 RDIMM
25	78P4199	4, 8, 12, 16, 24, or 32	64 GB, 2666 Mbps DDR4 RDIMM
26	01EM317	2	System processor heat sink kit (includes heat sink and TIM)
27	01EM896	2	12 core 3.8 GHz system processor module kit (includes system processor module, processor tray, 4 mm hex driver, module replacement tool, air pump, TIM)
27	01EM897	2	16 core 4.0 GHz system processor module kit (includes system processor module, processor tray, 4 mm hex driver, module replacement tool, air pump, TIM)
27	01EM898	2	20 core 3.8 GHz system processor module kit (includes system processor module, processor tray, 4 mm hex driver, module replacement tool, air pump, TIM)
28	00RY544	1	Time-of-day battery (CR2032)
29	00VK865	1	Trusted platform module
30	01EM894	1	System backplane kit (includes system backplane on a sheet, module removal tool, 4 mm hex key, air pump, TIM, tweezers, CPU socket covers)

Miscellaneous parts

Table 17. Miscellaneous system parts		
Description	Part number	Units per assembly
External USB DVD drive	01LU635	1

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- Operations that use a screen reader

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This product uses standard navigation keys.

Interface information

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