

Power Systems

*Planning for CEC hot-node add and  
hot-node repair maintenance*

**IBM**



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**Note**

Before using this information and the product it supports, read the information in "Safety notices" on page v, "Notices" on page 61, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM Power Systems™ servers that contain the POWER7 processor and to all associated models.

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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, 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:

- 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)

## 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.
- 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.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet 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.

#### 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. 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)

**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 no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- 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 230 mm (30 x 80 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.
  - 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)



(L002)



(L003)



or



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)

**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°C (212°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)

## **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.

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## Planning for CEC hot-node add and hot-node repair maintenance

CEC hot-node add and hot-node repair maintenance operations improve system availability by avoiding a scheduled system outage.

Hardware can be added and repaired while the system is powered on, but depending on the specific model, all critical applications should be quiesced (stopped or powered off), or moved to another system by using Live Partition Mobility (LPM). In addition, the Electronic Service Agent™ (ESA) must be enabled.

To effectively use CEC hot-node add and hot-node repair maintenance, there are tasks that must be performed by the customer and other tasks that must be performed by an IBM service provider.

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### What's new in Planning for CEC hot-node add and hot-node repair maintenance

Read about new or significantly changed information in Planning for CEC hot-node add and hot-node repair maintenance since the previous update of this topic collection.

#### September 2013

The following updates have been made to the content:

- Added the “Model 8412-EAD system firmware and HMC levels” on page 24 topic.

#### March 2013

The following updates have been made to the content:

- Added new information for 9179-MHC (IBM Power® 780) servers with a four socket CPU card: “Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer external SMP and FSP flex cabling” on page 45.
- Added new firmware levels for 9119-FHB (IBM Power 795) servers: “Model 9119-FHB system firmware and HMC levels” on page 28.
- Added the “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27 topic.

#### October 2011

The following updates have been made to the content:

- Added new firmware levels for 9117-MMC (IBM Power 770) and 9179-MHC (IBM Power 780) servers: “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26.

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### Customer information for CEC hot-node add and hot-node repair maintenance operations

Customer information details the tasks and related information on CEC hot-node add and hot-node repair maintenance operations for customers.

CEC hot-add and hot-repair tasks can be performed on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD), IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD), and

IBM Power 795 (9119-FHB) systems that are managed by a Hardware Management Console (HMC). The CEC hot-add and hot-repair tasks that are supported on a single-node 9117-MMD or 9179-MHD system are also supported on the 8412-EAD system.

CEC hot-add and hot-repair tasks provide the capability to perform maintenance (repair, add, or upgrade) on field replaceable units (FRUs) within a CEC while the system is powered-on. Even though the system remains powered-on, there may be impacts to the partitions and the performance of the system. For example, when a CEC node is physically removed from the system to repair a FRU, the processors, memory, and I/O resources that the node hosts will no longer be available to the partitions. The impacts on a specific system configuration vary depending on a number of factors that include spare memory resources, spare processor resources, and I/O redundancy configuration (mirroring or multipath).

For more information about the CEC concurrent maintenance functions on Power 770, Power 780, and Power 795 systems, see the IBM® Power 770/780 and 795 Servers CEC Hot Add & Repair Maintenance Technical Overview white paper.

## Preparing for Hot Repair or Upgrade utility

The Prepare for Hot Repair or Upgrade utility is a tool for the system administrator to identify the impacts to system resources in preparation for a hot node repair, hot node upgrade, or hot GX adapter repair operation. This utility provides an overview of platform conditions, partition I/O, and processor and memory resources that must be freed up for a node evacuation. (A *node* is a drawer in a 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, or 9179-MHD system. A *node* is a processor book in a 9119-FHB system.)

All resources identified by the Prepare for Hot Repair or Upgrade utility must be freed up by the system administrator prior to the start of the hot upgrade or repair procedure by the SSR.

The Prepare for Hot Repair or Upgrade utility is automatically run during every service procedure requiring the evacuation of a node. This ensures that all impacts are addressed before the execution of the repair or upgrade procedure.

There is no impact to existing system resources when a hot node or GX adapter add operation is performed, so running this utility is not required for those operations.

*Node evacuation* is a process that is required during a hot node repair or a memory upgrade. During the node evacuation process, the POWER Hypervisor™ is used to complete the following tasks:

- Moving the contents of the memory in the target node to the memory in the other nodes in the system.
- Moving the programs running on dedicated processors assigned to the partitions, and the programs running on processors assigned to the shared processor pool, from the target node to other nodes on the system.
- Locking all the I/O slots that are attached to the target node to prevent the slots from being used during the repair or upgrade.

If the system is managed by a Hardware Management Console (HMC), use this procedure.

To prepare for a Hot Repair or Upgrade procedure, complete the following steps:

1. In the navigation pane, select **Systems Management > Servers**.
2. In the work pane, select the server name on which the procedure will be performed.
3. In the tasks area, select **Serviceability > Hardware > Prepare for Hot Repair/Upgrade**.
4. Select the base location code that contains the field-replaceable unit (FRU) to be serviced or the GX adapter card to be replaced as shown in Figure 1 on page 3.

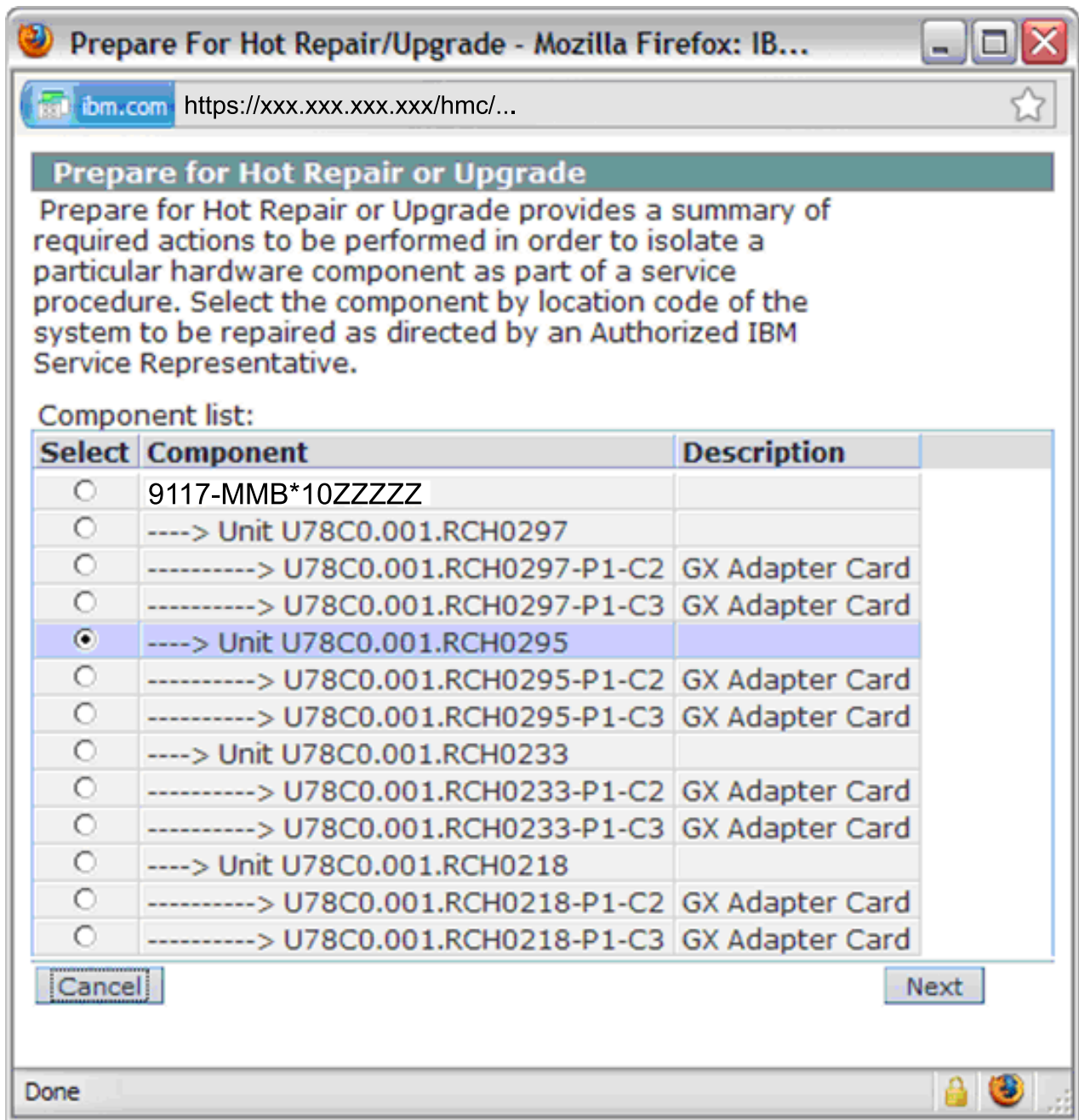


Figure 1. FRU selection within Prepare For Hot Repair or Upgrade Utility

5. Click **Next**.

6. Click **OK** when prompted to continue with the Advanced Power Control command.

The Prepare for Hot Repair or Upgrade utility displays one of the following options:

- A message indicates why a node evacuation of the selected node is not allowed.
- A window lists the set of actions that must be performed (prior to the CEC hot-node add and hot-node repair maintenance operation) for the node evacuation to be successful. An example of this window is shown in Figure 2 on page 4.

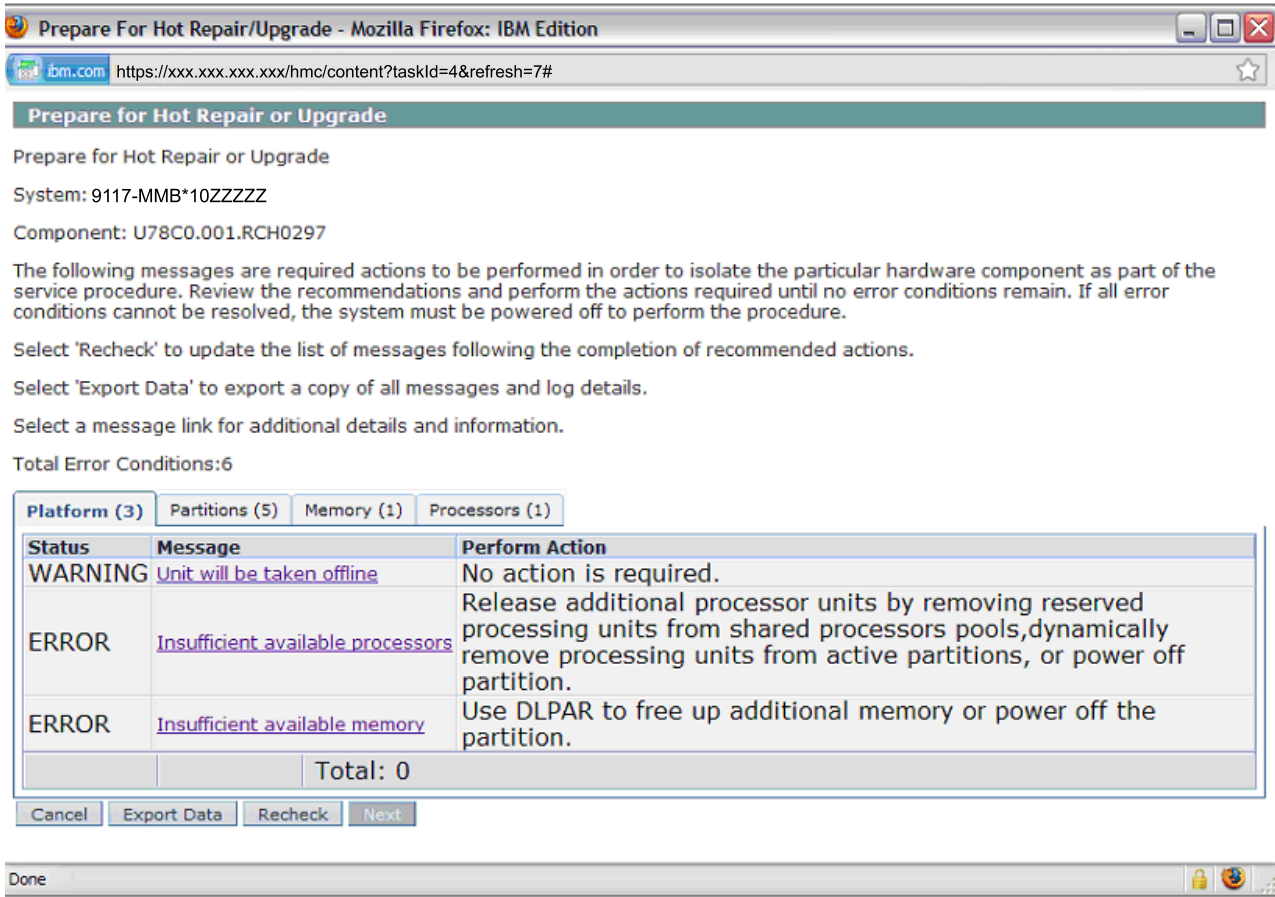


Figure 2. Prepare for Hot Repair or Upgrade Main window

The Prepare for Hot Repair or Upgrade window displays a summary of conditions that must be corrected before starting the node evacuation process. Use the four tabs (**Platform**, **Partitions**, **Memory**, and **Processors**) to view errors or warnings. An individual message can be selected to view additional details.

7. All error conditions must be corrected prior to the evacuation of the selected node as part of a CEC hot-node add and hot-node repair maintenance operation. Warning conditions might affect the system or partitions, but do not prevent the hot repair or upgrade from proceeding.

**Note:** The **Next** button on this utility is not active when the utility is launched outside an actual service procedure as described here. When an IBM service provider initiates a service procedure to repair or upgrade the system, the **Next** button is active.

8. Click **Recheck** to reevaluate the systems readiness for node evacuation without restarting the utility.
9. Click **Cancel** to exit the Prepare for Hot Repair or Upgrade utility.
10. When all error conditions are corrected, an IBM service provider can proceed with the repair or upgrade procedure.

When working with the warning and error messages shown in the Prepare for Hot Repair or Upgrade utility, resolve the Platform and Partition messages first. The impacts to the platform and partitions noted in these messages might cause partitions to be shut down for various reasons (such as I/O resources being used by the partition in the target node). Working with the warning and error messages in this order avoids the situation in which memory and processor resources are removed from partitions using DLPAR operations, only to discover that additional partitions must be shutdown before the node evacuation later.



**Note:** Shutting down a partition frees up memory and processor resources. If a partition must be shut down, click **Recheck** to reevaluate the memory and processor resources.

## Common messages for Prepare for Hot Repair or Upgrade

Some of the common error conditions and warning messages that are displayed in the Prepare for Hot Repair or Upgrade utility for node evacuation are listed in Table 1. Additional details are available for each of the error or warning message displayed by this utility to describe the condition. They can be viewed by clicking on the message.

If the error condition cannot be resolved, the node evacuation cannot continue. Contact your authorized service provider for assistance or proceed with a nonconcurrent repair, which will require the system to be powered off.

*Table 1. Common error conditions and information messages*

Message type	Common error condition or information message	Description
Processor message	Insufficient available processors	<p>This message indicates that the remaining nodes do not have enough processors to support the currently active logical partitions on the system. Use the <b>Processors</b> tab to view information about this error condition, and the processing resources that must be made available to proceed with the node evacuation, as shown in Figure 3 on page 9.</p> <p>Processing units can be made available in several ways, including removing reserved processing units from shared processor pools, dynamically removing processing units from active partitions, and powering off partitions. See Removing processor resources dynamically using the Hardware Management Console.</p> <p>After the completion of the service procedure, the processing resources are not automatically returned to the logical partitions. Use dynamic logical partitioning (DLPAR) operations to return the processing resources to the logical partitions.</p>
Memory message	Insufficient available memory	<p>This message indicates that the remaining nodes do not have enough memory to support the currently active logical partitions on the system. Use the <b>Memory</b> tab to view information about this error condition and the memory resources that must be made available to proceed with the node evacuation.</p> <p>Partitions can be deactivated or DLPAR can be used to decrease the memory resources used by active logical partitions. See Removing memory dynamically using the Hardware Management Console.</p> <p>After the completion of the service procedure, the memory resources are not automatically returned to the logical partitions. Use DLPAR operations to return the memory resources to the logical partitions.</p>

Table 1. Common error conditions and information messages (continued)

Message type	Common error condition or information message	Description
Platform messages	Unit will be taken offline	<p>This message is a warning message that indicates a system unit or expansion unit will be varied off during the service procedure. Click the message text to view more details about this warning message, as shown in Figure 4 on page 10.</p> <p><b>Note:</b> No specific action is required for this warning message. Resources that require action or attention from the system administrator, such as PCI adapters that must be deconfigured, will be identified separately in error or warning messages.</p>
Partition messages	In-use I/O resource	<p>This message indicates that an I/O resource is in use by an active IBM i logical partition that will be affected by the node evacuation procedure. This message includes information about what must be done to correct the error. Click the message text to view information about the resources being used, as shown in Figure 5 on page 11.</p> <p>For IBM i resources that are being used, the system does not allow the targeted system node to be evacuated unless all configuration descriptions that use resources in the target system unit node are varied off. For more information, see the Vary Configuration (VRYCFG) command.</p>
	Critical disk resource attached	<p>This error message that indicates that disk units that are being used by an active IBM i partition is affected by the service action. Click the message text to view details about these disk units and logical partitions that are affected, as shown in Figure 6 on page 12. The logical partitions listed in the detailed information must be powered off before the node evacuation can proceed.</p>
	I/O resource in use by AIX® partition	<p>This message indicates that an I/O resource is being used by an active AIX logical partition that will be affected by the node evacuation procedure. An example of this message on the Partition tab is shown in Figure 7 on page 13. The HMC uses resource monitoring and control (RMC) flows to query the logical partition about resources. RMC must be active on a logical partition for these queries to succeed. An error in response to this query command indicates that an I/O resource must be deconfigured before the node evacuation proceeds. Click the message text to view information about the resources being used, as shown in Figure 8 on page 14.</p> <p>For this message, the targeted node cannot be evacuated unless the resources are deconfigured. This is done by using the <b>rmdev</b> command. If logical devices that use resources in the system node cannot be deconfigured, the operation must be delayed until they can be deconfigured or the logical partitions that own the resources must be powered off. For more information, see the AIX Remove device (rmdev) command.</p>

Table 1. Common error conditions and information messages (continued)

Message type	Common error condition or information message	Description
Partition messages	I/O resource in use by Linux partition	<p>This message indicates that an I/O resource that is being used by an active Linux logical partition is impacted by the node evacuation procedure. An example of this message on the <b>Partitions</b> tab is shown in Figure 9 on page 15. The HMC uses resource monitoring and control (RMC) flows to query the logical partition about resources. RMC must be active on a logical partition for these queries to succeed. An error in response to this query command indicates that an I/O resource must be deconfigured before the node evacuation proceeds. Click the message text to view information about the resources being used, as shown in Figure 10 on page 16.</p> <p>The utility allows the targeted node to be evacuated even if logical device resources that use physical resources in the target node remain configured in a Linux logical partition. The procedure continues even if the Linux logical partition might be affected by the removal of resources from the partition during of the service action. This general policy of fewer restrictions on resources owned by Linux logical partitions during CEC hot-node add and hot-node repair maintenance operations is consistent with the Linux operating system guidelines. However, the system administrator must assess the impact to the Linux environment of the loss of the resources identified by these messages. The resources identified in this window can be deconfigured if the system administrator wants to do so.</p>
	Connection to partition cannot be established	<p>This error message indicates that the resource monitoring and control (RMC) connection to one of the logical partitions cannot be established. Click the message text to view more details for this error. The concurrent maintenance procedure cannot be done unless the RMC connection is working or the logical partition identified in the detailed error information is powered down. You can verify the RMC connection between the partition and the HMC (Hardware Management Console) by using the Verifying RMC connections for the mobile partition procedure. To learn more about configuring and using RMC, see Understanding RMC and resource managers in the RCST Administration Guide.</p>
	Connection to partition was lost	<p>This error message indicates that the RMC connection to one of the logical partitions was lost. Click on the message text to view more details for this error. The concurrent maintenance procedure cannot be done unless the RMC connection is working, or the logical partition identified in the detailed error information is powered down. You can verify the RMC connection between the partition and the Hardware Management Console (HMC) using the Verifying RMC connections for the mobile partition procedure. To learn more about configuring and using RMC, see Understanding RMC and resource managers in the RCST Administration Guide.</p>

Table 1. Common error conditions and information messages (continued)

Message type	Common error condition or information message	Description
Partition messages	Partition not node evacuation-capable	<p>This error message indicates that an IBM i partition is not capable of supporting the node evacuation function. Click on the message text to view the name of the partition that does not support node evacuation. The partition must be shut down or upgraded to complete the procedure.</p> <p>IBM i V5R4M5 and V6R1M0 support the node evacuation process when the following enablement PTFs are installed:</p> <ul style="list-style-type: none"> <li>• V5R4M5 - MF45678</li> <li>• V6R1M0 - MF45581</li> </ul>
	VIO Client Impacted	<p>In a virtualized environment, a VIOS (Virtualized I/O Server) partition hosts the I/O resources for other partitions on the system. Error messages are provided for I/O resources that are impacted by the service procedure that is owned by the VIOS partition. In addition, the VIOS client impacted warning message indicates the hosted partitions that might also be impacted. Click the message text to view the names of the partitions that might be impacted.</p>

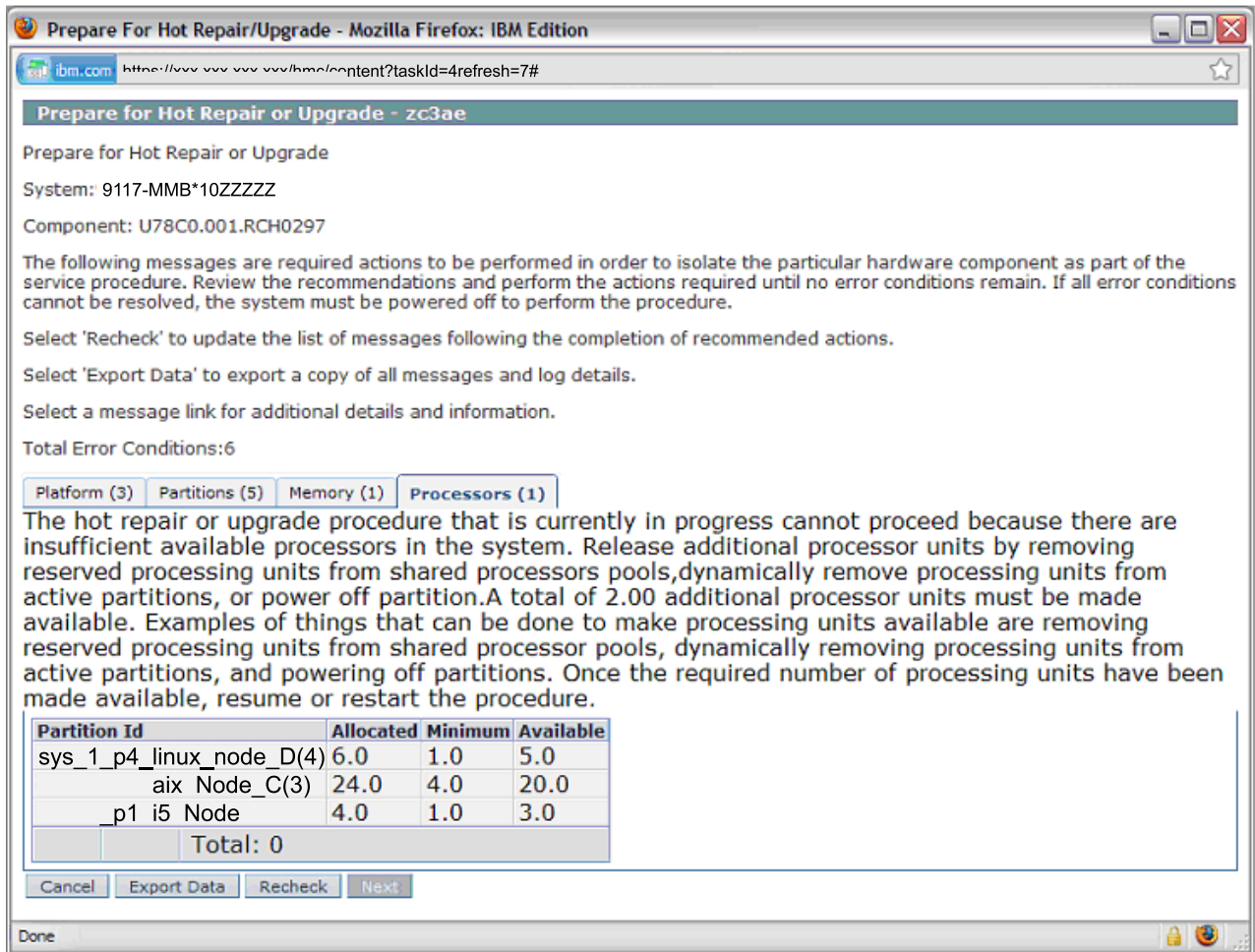


Figure 3. Processors tab showing insufficient processors condition

Prepare For Hot Repair/Upgrade - Mozilla Firefox: IBM Edition

https://xxx.xxx.xxx.xxx/hmc/content?taskId=4&refresh=7#

### Prepare for Hot Repair or Upgrade

Prepare for Hot Repair or Upgrade

System: 9117-MMB\*10ZZZZZ

Component: U78C0.001.RCH0297

The following messages are required actions to be performed in order to isolate the particular hardware component as part of the service procedure. Review the red messages. If all error conditions cannot be resolved, the system may be taken offline.

Select 'Recheck' to update the list of error conditions.

Select 'Export Data' to export a copy of the error conditions.

Select a message link for additional information.

Total Error Conditions: 6

**Prepare for Hot Repair or Upgrade**

System: 9117-MMB\*10ZZZZZ

Component: U78C0.001.RCH0297

Additional Information:

This is an informational return code that identifies a CEC unit or expansion unit which will be affected by the service procedure being performed. The location code of the unit that will be taken offline is: U78C0.001.RCH0297

[close](#)

Status	Message	Perform Action
WARNING	<a href="#">Unit will be taken offline</a>	No action is required.
ERROR	<a href="#">Insufficient available processors</a>	Release additional processor units by removing reserved processing units from shared processors pools, dynamically remove processing units from active partitions, or power off partition.
ERROR	<a href="#">Insufficient available memory</a>	Use DLPAR to free up additional memory or power off the partition.
Total: 0		

https://xxx.xxx.xxx.xxx/hmc/content?taskId=4&refresh=7#

Figure 4. Details for the Unit will be taken offline message

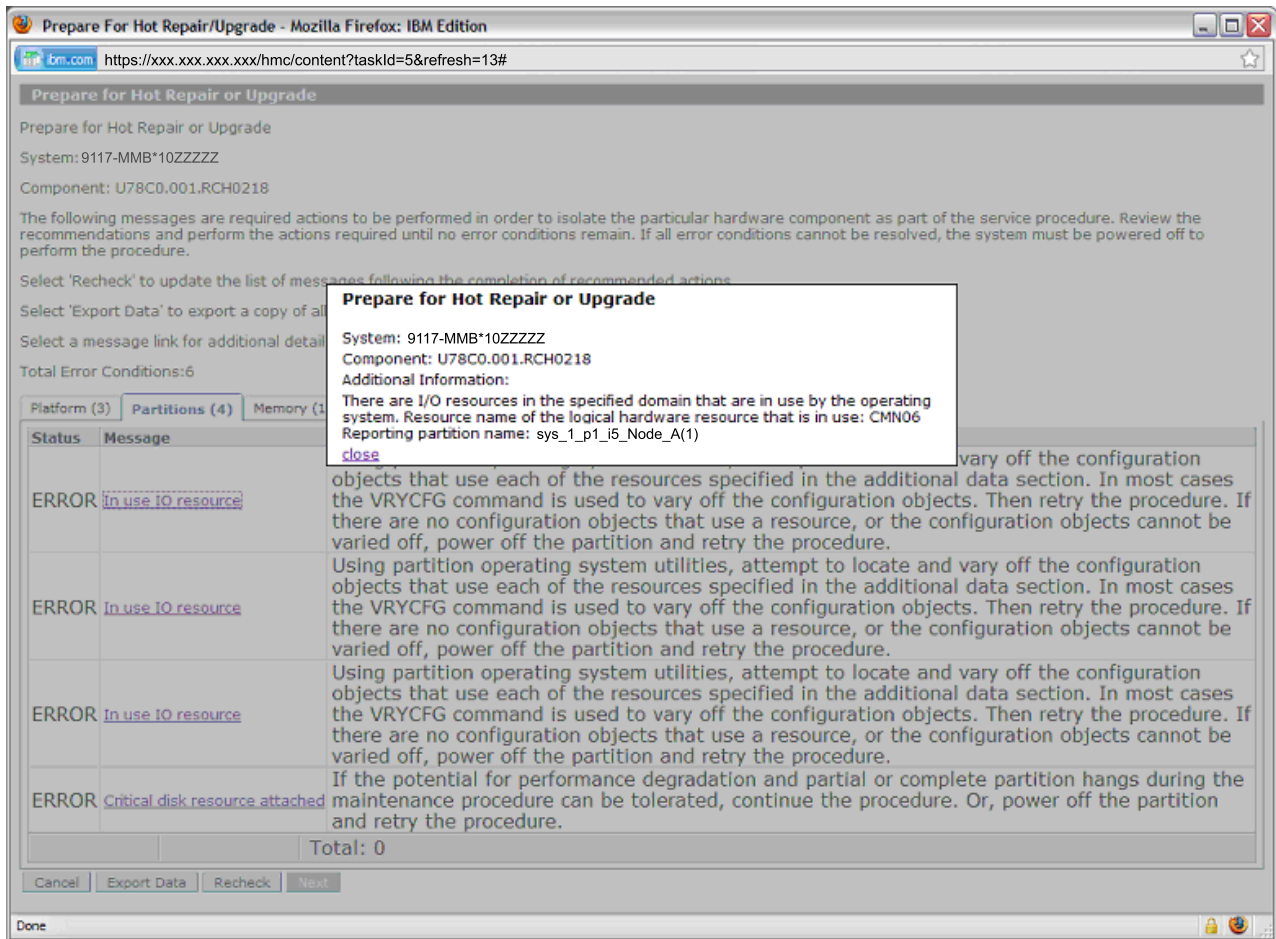


Figure 5. Details for the IBM i In use IO resource message

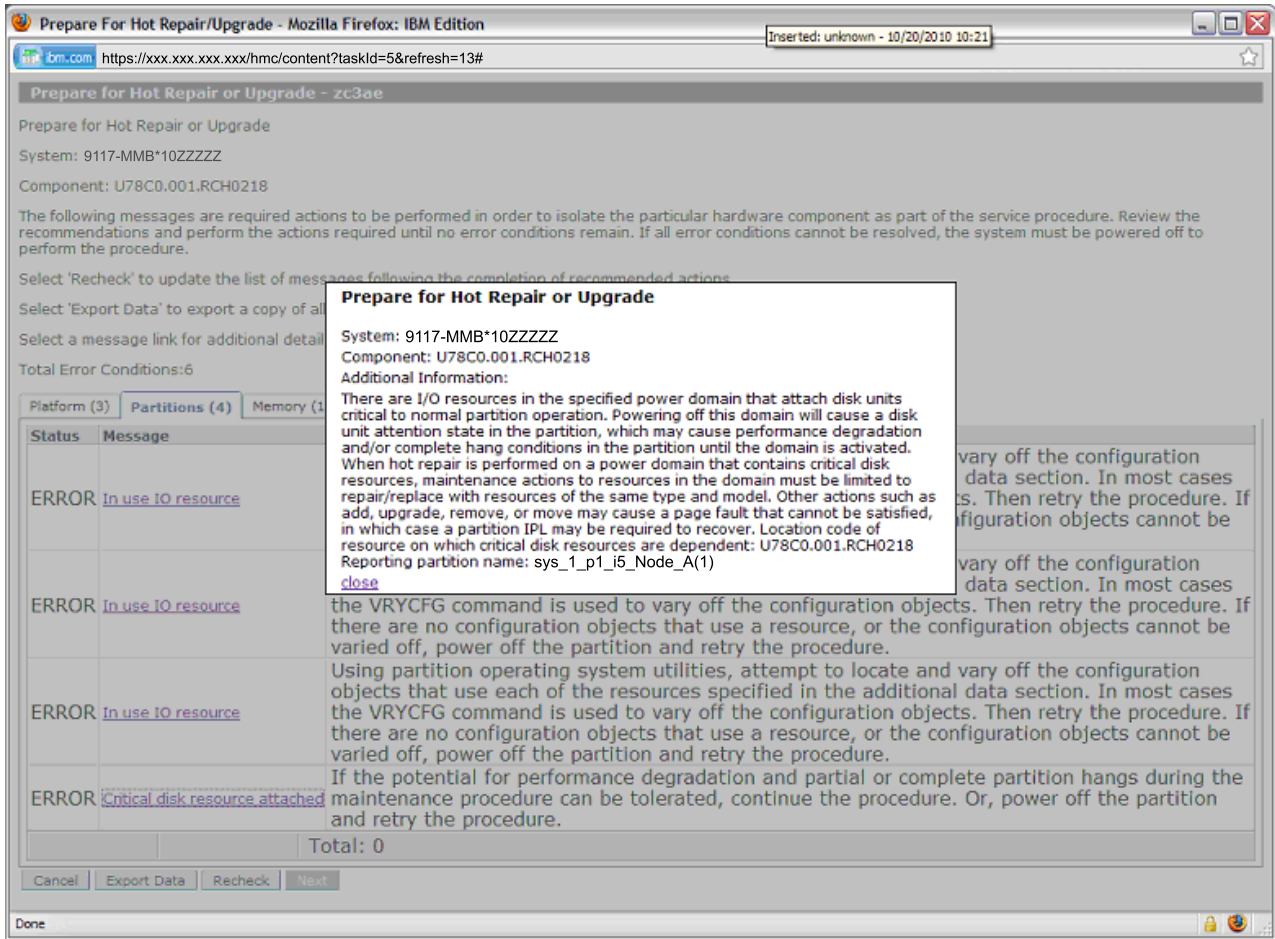


Figure 6. Details for the Critical disk resource attached message



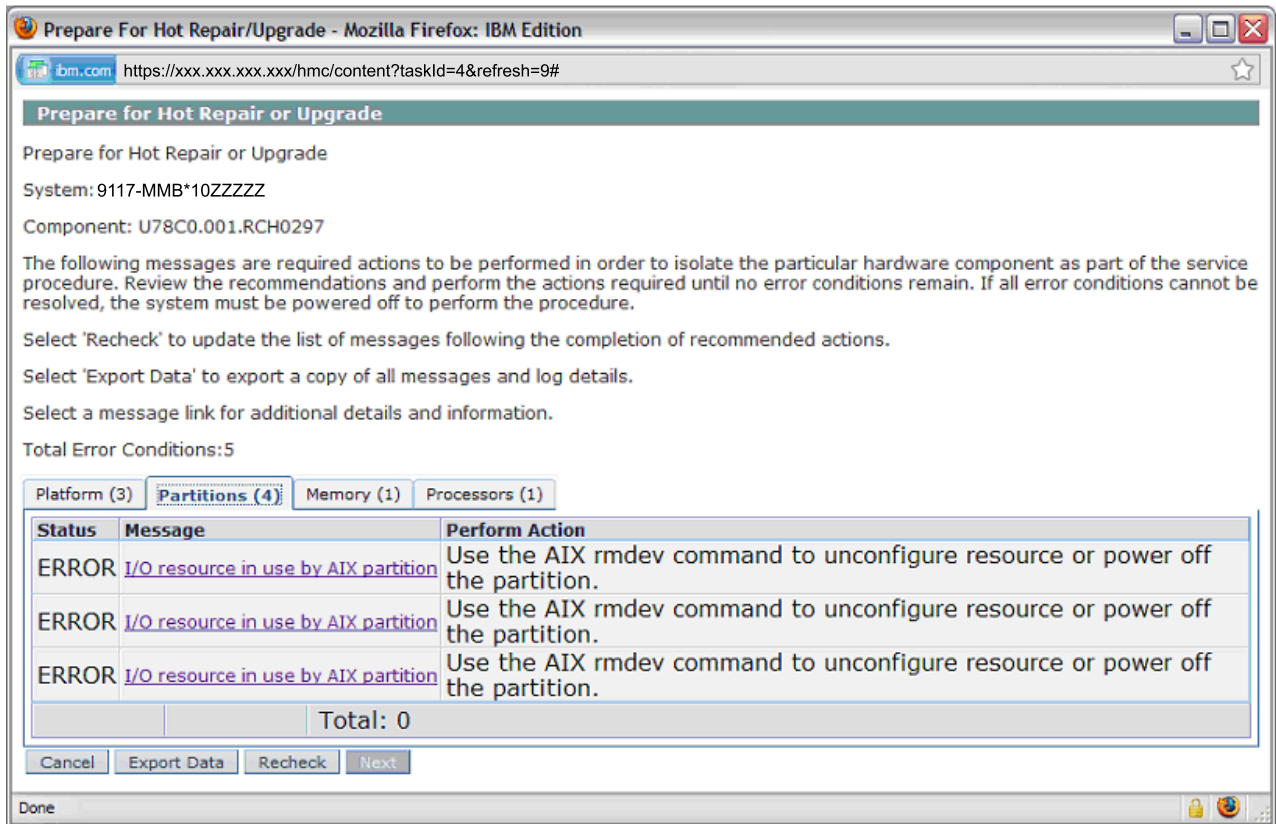


Figure 7. Partitions tab showing error messages for AIX resources

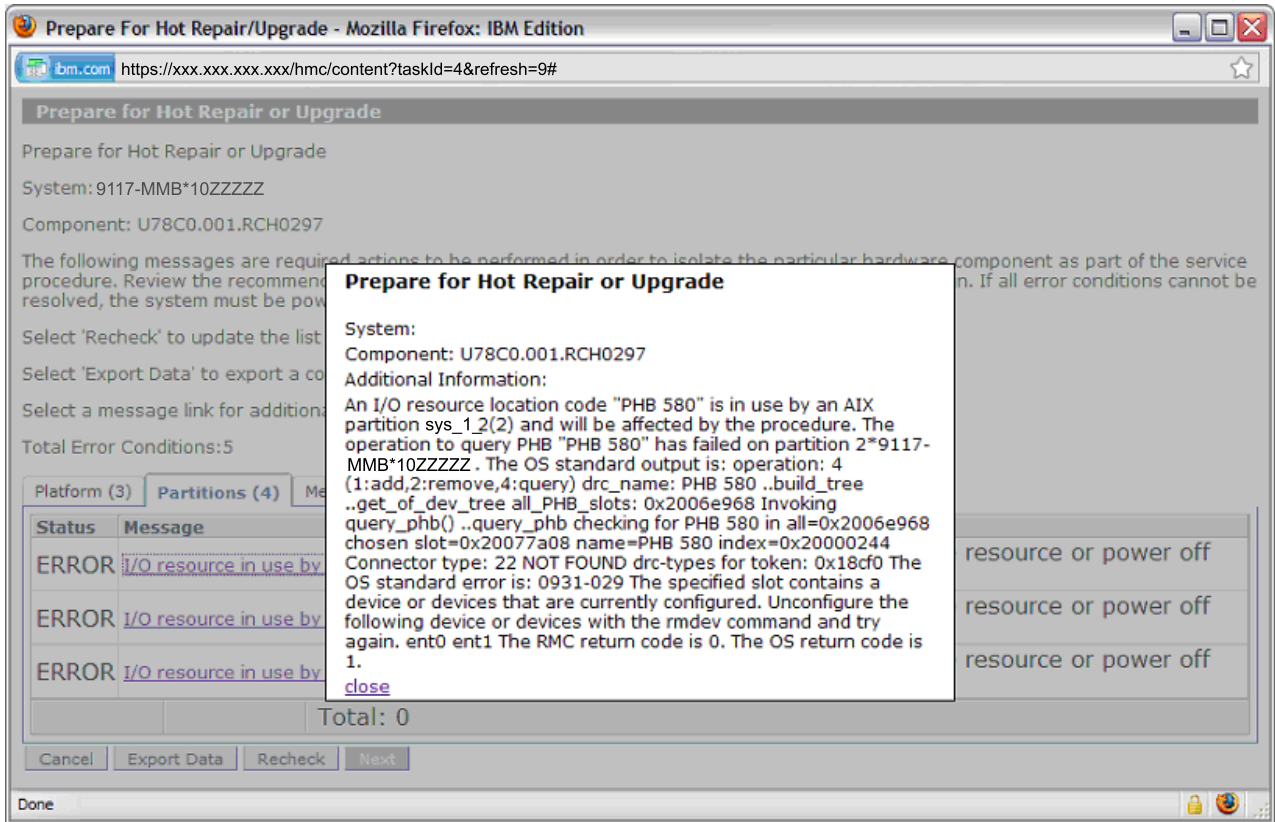


Figure 8. Details for the I/O resource in use by AIX partition message

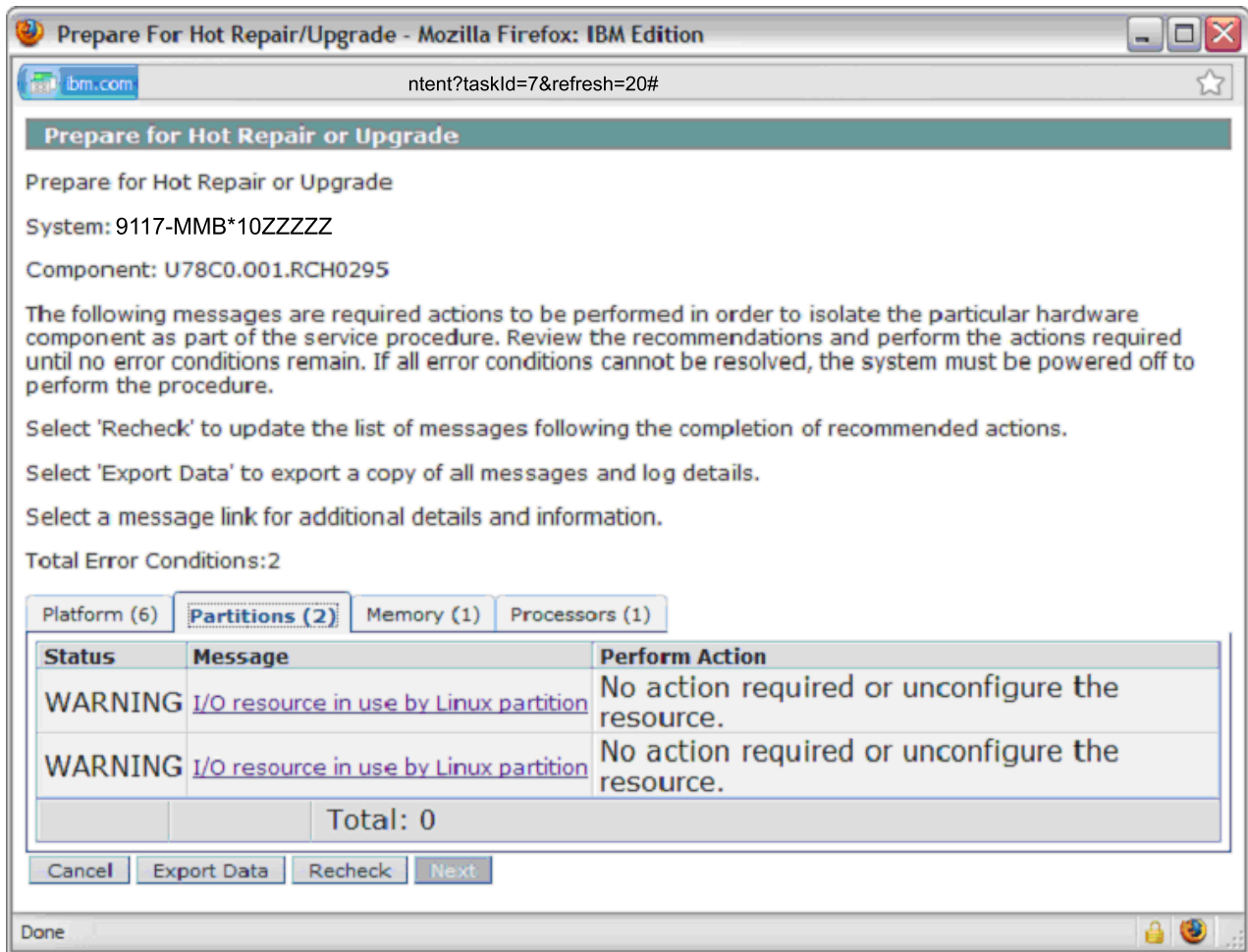


Figure 9. Partitions tab showing error messages for Linux resources

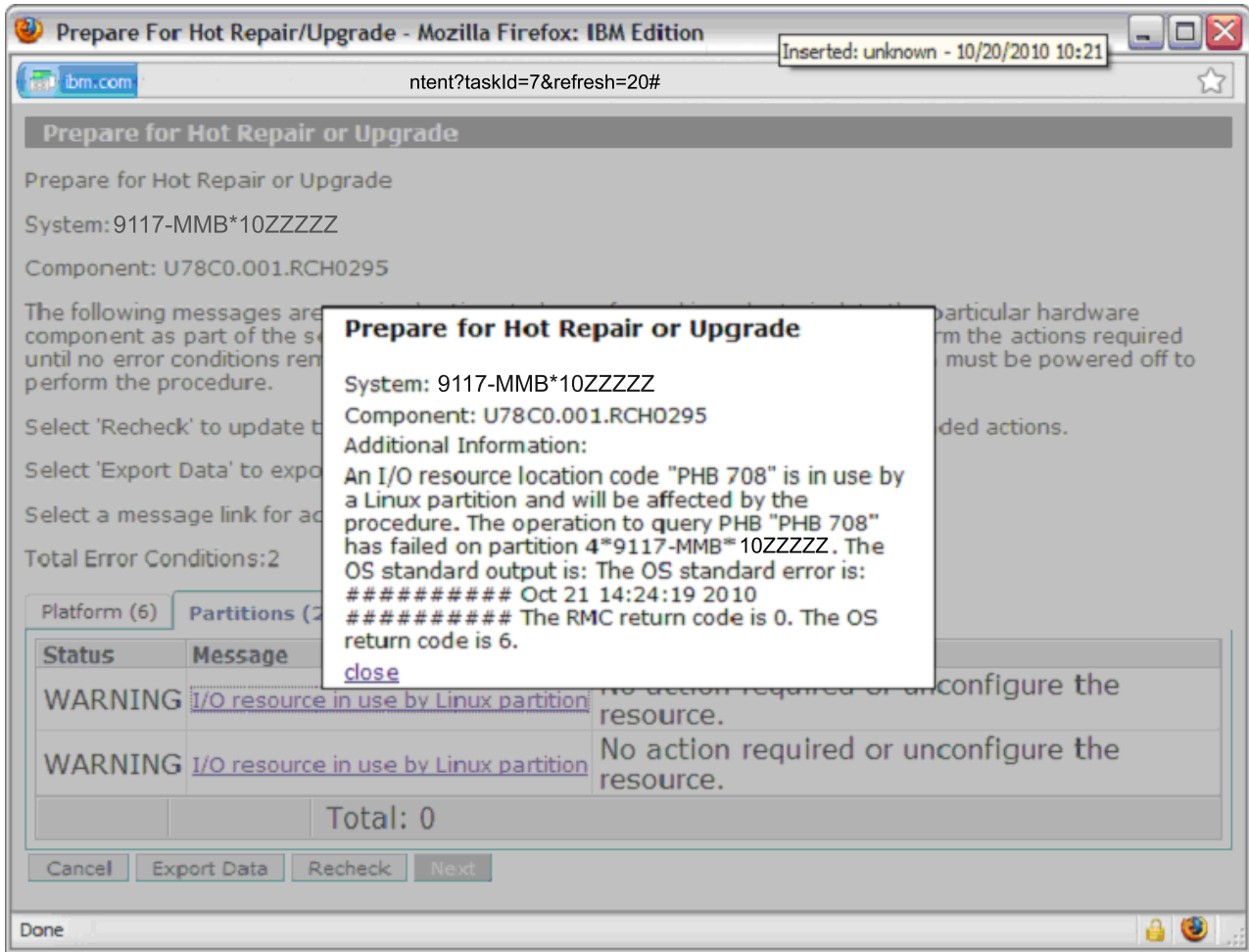


Figure 10. Details for the I/O resource in use by Linux partition message

## CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD

The planning checklists contain a list of tasks that must be completed before you perform CEC hot-node add and hot-node repair maintenance operations on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD) and IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD) systems. It also lists which tasks are associated with each type of operation.

For guidelines that apply to all CEC adapter hot-add and hot-repair maintenance operations, see “Prerequisites for CEC hot-add and hot-repair” on page 31. These general guidelines and the following checklist must be followed.

Table 2. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node add	Ensure that sufficient space is available in the rack that contains the system for another node to be installed under the existing nodes.	Customer

Table 2. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node add	<p>Adding a node increases the power requirements of the system. If necessary, the power circuits that supply the system must be upgraded to handle these additional power requirements. This upgrade must be complete before the hot-node add begins.</p> <p>The power requirements of additional nodes are detailed in Chapter 4, <b>Server Specifications</b> and Chapter 8, <b>Planning for Power</b> in Site and Hardware Planning.</p>	Customer responsibility to perform the required site planning activities
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	<p>If the system is managed by a Hardware Management Console (HMC), verify that the HMC level is the same as, or later than, the level shown in “Model 8412-EAD system firmware and HMC levels” on page 24, “Model 9117-MMB and 9179-MHB system firmware and HMC levels” on page 25, “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26, or “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27.</p> <p>Verify that the system firmware level is the same as, or later than, the level shown in “Model 8412-EAD system firmware and HMC levels” on page 24, “Model 9117-MMB and 9179-MHB system firmware and HMC levels” on page 25, “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26, or “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27.</p> <p>For information about determining firmware levels using the Hardware Management Console (HMC), see Using the HMC to view the existing firmware levels.</p> <p>For information about disconnecting an HMC from a managed system, see Removing HMC connection data.</p>	Customer Service representative must verify
Hot-node upgrade (memory), hot-node add, and hot-node repair	<p><b>CAUTION:</b></p> <p>Observe the following with the Symmetric Multiprocessing (SMP) and the service processor cables on IBM Power ESE, Power 770, and Power 780 systems when performing a CEC hot add or repair operation:</p> <ul style="list-style-type: none"> <li>• Verify that the SMP cable (on the front of the system) and the service processor cable (on the rear of the system) are layered correctly. See “Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer external SMP and FSP flex cabling” on page 45. Do not start the CEC hot add or repair operation if the layering is not correct. If the layering is not correct, schedule a system outage with the customer to correct the cabling and perform the CEC hot add or repair operation with the power turned off.</li> <li>• Do not disturb the SMP and the service processor cables on active nodes. If a node repair is being performed, remove only the cables on the node that is being repaired (powered off) unless otherwise directed by WCII instructions or the removal and replacement procedure.</li> </ul>	Service representative must verify

Table 2. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If there is only one partition running on the system, the system can be powered down if that partition must be shut down during the CEC hot add or repair operation. To verify or change the setting that controls this behavior, see <b>System power off policy</b> in Powering the system on and off.	Service representative
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	Verify that service processor redundancy is enabled, except on a system with a single node.  To enable service processor redundancy on the managed system on an HMC, in the navigation area, select <b>Serviceability &gt; FSP Failover &gt; Setup</b> . Failover status is displayed in the contents area and can be enabled or disabled. <b>Note:</b> The server must be power cycled for the enabling of service processor redundancy to take effect. If power cycling is required, the node can be added nonconcurrently (with power off).  For information about redundancy on the HMC, see FSP Failover.	Customer  Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	If the system is managed by an HMC, verify the network connections between the system service processors and the HMC before the service representative arrives by using the service processor status function on the HMC. For information about testing the network connections on the HMC, see Testing the connection between the HMC and the managed system.	Customer  Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	Ensure that Electronic Service Agent (ESA) is enabled to <b>call home</b> .  For additional details about the <b>call home</b> function on the HMC, see Manage Systems Call-Home.	Customer  Service representative must verify

Table 2. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node add, hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>For 9117-MMB and 9179-MHB systems, you should quiesce the server before the hot-node operation. This means that all critical application should be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt.</p> <p>For 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHC, and 9179-MHD systems, you must quiesce the server before the hot-node operation. This means that all critical applications must be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt.</p> <p>For additional information on a system managed by an HMC, see <b>Mobility</b> in the <b>Systems management for partitions</b> topic in <i>Managing the Hardware Management Console</i>.</p> <p><b>Note:</b> IBM recommends that adequate protection is in place for business critical applications before you perform CEC hot-node add and hot-node repair maintenance operations. To mitigate the possibility of an unexpected outage, you can manually move critical workloads to another server before the operation begins. Performing CEC hot-node add and hot-node repair maintenance operations during a regularly scheduled maintenance window or during off-peak hours reduces the impact of an unplanned outage.</p>	Customer
Hot-node add and hot-node upgrade (memory)	Obtain and apply Capacity Upgrade on Demand (CUoD) activation codes prior to the operation so that the memory resources are available immediately after the hot add operation. For information about CUoD activation codes, see Capacity Upgrade on Demand activation codes.	Customer
Hot-node add and hot-node upgrade (memory)	If the customer wants to dynamically add the new processors and memory resources to activated partitions after the Hot-node add, the profiles that were used to activate the partitions must have the maximums for memory set to the appropriate values. When the Hot-node add is complete, the processor and memory resources can be added to the partitions by using dynamic logical partitions (DLPAR). For information about DLPAR, see Dynamic logical partitioning.	Customer
Hot-node upgrade (memory)	Verify that more than one node is present in the system. Hot-node upgrade (memory) cannot be done if the system has only one node.	Customer Service representative must verify
Hot-node repair, hot GX adapter repair, and hot-node upgrade (memory)	Run the Preparing for Hot Repair or Upgrade utility on the HMC to determine if the system is prepared for a node upgrade (memory). For more information about the utility, see Preparing for hot repair or upgrade.	Customer Service representative must verify
Hot-node add and concurrent GX adapter add	System firmware enforces the node and GX adapter plugging order. Only the next GX adapter slot or node position based on the plugging order is available.	Customer Service representative must verify

Table 2. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Concurrent GX adapter add	Ensure that there is a GX adapter slot reservation for each GX adapter that is being added. Each installed GX adapter and GX adapter slot reservation consumes approximately 128 MB of memory. Additional GX adapter slots can be reserved by using the Advanced System Management Interface (ASMI). New GX adapter slot reservations take effect the next time the system is powered on.	Customer
Concurrent GX adapter add	The GX adapter cannot be added to a node that has been deconfigured. The node must be repaired and reconfigured before another GX adapter can be added. To verify that all nodes in the system are configured, see Using the ASMI to view deconfigured resources.	Customer Service representative must verify onsite <sup>1</sup>
Hot-node add	When multiple hot adds are planned that include node and GX adapter adds, the GX adapter(s) should be installed in the node before the node is installed in the system.	Service representative
Hot-node add and concurrent GX adapter add	For multiple upgrades that include node or GX adapter adds, as well as I/O drawer adds, the node or GX adapter add must be completed first. The I/O drawer can then be added as a separate concurrent I/O drawer add.	Service representative
Hot-node repair and hot GX adapter repair	Ensure that the replacement parts are the same type as the parts that are being removed.	Service representative
Hot-node repair and hot GX adapter repair	Replace only the existing parts. New hardware must not be added during a Hot-node repair or a hot GX adapter repair.	Service representative
Hot-node repair	Ensure that existing node hardware is not moved during the Hot-node repair.	Service representative
<sup>1</sup> Hardware in a node can fail at any time. When this happens a node can become unconfigured during system IPL to isolate the failure. The failure and unconfigured event can occur after the hardware upgrade package has arrived at the customer site and the service representative has been dispatched. The service representative must ask the customer if the system has any outstanding deferred repairs. <b>Note:</b> The hot-node add function adds and enables the I/O adapters only in the new node.		

## CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB

The planning checklists contain a list of tasks that must be completed before you perform CEC hot-node add and hot-node repair maintenance operations on an IBM Power 795 (9119-FHB) system. It also lists which tasks are associated with each type of operation.

For guidelines that apply to all CEC adapter hot-add and hot-repair maintenance operations, see “Prerequisites for CEC hot-add and hot-repair” on page 31. These general guidelines and the following checklist must be followed.



Table 3. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB

Operations	Model 9119-FHB tasks	Responsibility
Hot-node add, hot-node upgrade (memory), and hot-node repair	Engineering change announcement (ECA) 256 must be installed on the system before starting a CEC hot-node add and hot-node repair maintenance operation. This ECA ensures that the system controllers are at the minimum hardware EC level that is required to perform one of these operations on a model 9119-FHB. Contact your authorized service provider for more information on ECA 256.	Customer Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	<p>If the system is managed by a Hardware Management Console (HMC), verify that the HMC level is the same as, or later than, the level shown in “Model 9119-FHB system firmware and HMC levels” on page 28.</p> <p>Verify that the system firmware level is the same as, or later than, the level shown in “Model 9119-FHB system firmware and HMC levels” on page 28.</p> <p>For information about determining firmware levels using the Hardware Management Console (HMC), see Using the HMC to view the existing firmware levels.</p> <p>For information about disconnecting an HMC from a managed system, see Removing HMC connection data.</p>	Customer Service representative must verify
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If the system has one or more partitions running IBM i, PTF MF52971 must be downloaded from the Fix Central website ( <a href="http://www-933.ibm.com/support/fixcentral">http://www-933.ibm.com/support/fixcentral</a> ) and installed.	Customer Service representative must verify
Hot-node add, hot-node upgrade (memory), and concurrent GX adapter add	All serviceable hardware events must be repaired and closed before starting a hot add or upgrade operation. This eliminates the possibility that an existing hardware failure will cause the hot add operation to fail. The existing nodes in the system must be in a functional state before a hot-node add operation.	Service representative
Hot-node repair and hot GX adapter repair	Other hardware serviceable events outside of the CEC must be repaired before starting a hot repair operation. This eliminates the possibility of other hardware failures interfering with the hot repair operation.	Service representative
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<ul style="list-style-type: none"> <li>The Prepare for Hot Repair or Upgrade (PHRU) utility must be run by the system administrator to determine the processor, memory and I/O resources that need to be freed.</li> <li>All resources identified by the PHRU utility must be freed up by the system administrator prior to the start of hot upgrade or repair procedure by the SSR.</li> </ul>	Customer Service representative must verify
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If there is only one partition running on the system, the system can be powered down if that partition must be shut down during the CEC hot add or repair operation. To verify or change the setting that controls this behavior, see <b>System power off policy in Controlling the system power using the ASMI</b> at Managing the Advanced System Management Interface.	Service representative

Table 3. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB (continued)

Operations	Model 9119-FHB tasks	Responsibility
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>Verify that service processor redundancy is enabled.</p> <p>To enable service processor redundancy on the managed system on an HMC, in the navigation area, select <b>Serviceability &gt; FSP Failover &gt; Setup</b>. Failover status is displayed in the contents area and can be enabled or disabled.</p> <p><b>Note:</b> The server must be power cycled for the enabling of service processor redundancy to take effect. If power cycling is required, the node can be added nonconcurrently (with power off).</p> <p>For information about redundancy on the HMC, see FSP Failover.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>If the system is managed by an HMC, verify the network connections between the system service processors and the HMC before the service representative arrives by using the service processor status function on the HMC. For information about testing the network connections on the HMC, see Testing the connection between the HMC and the managed system.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>Ensure that Electronic Service Agent (ESA) is enabled to <b>call home</b>.</p> <p>For additional details about the <b>call home</b> function on the HMC, see Manage Systems Call-Home.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>For 9119-FHB systems, you should quiesce the server before the hot-node operations. This means that all critical applications must be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt. For additional information on a system managed by an HMC, see <b>Mobility</b> in the <b>Systems management for partitions</b> topic in Managing the Hardware Management Console.</p>	<p>Customer</p>
Hot-node upgrade (memory)	<p>Verify that more than one node is present in the system. Hot-node upgrade (memory) cannot be done if the system has only one node.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add and hot-node upgrade (memory)	<p>Obtain and apply Capacity Upgrade on Demand (CUoD) activation codes prior to the operation so that the memory resources are available immediately after the hot add operation. For information about CUoD activation codes, see Capacity Upgrade on Demand activation codes.</p>	<p>Customer</p>
Hot-node upgrade (memory)	<p>If the customer wants to dynamically add the new processors and memory resources to activated partitions after the hot-node add, the profiles that were used to activate the partitions must have the maximums for memory set to the appropriate values. When the hot-node add is complete, the processor and memory resources can be added to the partitions using dynamic logical partitions (DLPAR). For information about DLPAR, see Dynamic logical partitioning.</p>	<p>Customer</p>

Table 3. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB (continued)

Operations	Model 9119-FHB tasks	Responsibility
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>Features and capabilities that do not support resource relocation, which is required for a hot-node upgrade (memory), hot-node repair, and GX adapter repair:</p> <ul style="list-style-type: none"> <li>• Systems clustered using RIO-SAN technology. This technology is used only by IBM i customers with clustered systems using switchable towers and virtual OptiConnect technologies.</li> <li>• Systems clustered using InfiniBand technology. This capability is typically used by high performance computing customers using an InfiniBand switch.</li> <li>• I/O Processors (IOPs) used by IBM i partitions do not support node evacuation. Any IBM i partition that has an IOP assigned must either have the IOP powered off, or the partition must be powered off.</li> <li>• Memory pages of 16 GB, also known as huge pages, do not support memory relocation. Partitions with 16 GB pages must be powered off to allow CEC hot-node add and hot-node repair maintenance operations.</li> </ul>	Customer
Hot-node add and concurrent GX adapter add	System firmware enforces the node and GX adapter plugging order. Only the next GX adapter slot or node position based on the plugging order is available.	Customer Service representative must verify
Concurrent GX adapter add	Ensure that there is a GX adapter slot reservation for each GX adapter that is being added. Each installed GX adapter and GX adapter slot reservation consumes approximately 128 MB of memory. Additional GX adapter slots can be reserved using the Advanced System Management Interface (ASMI). New GX adapter slot reservations take effect the next time the system is powered on.	Customer
Hot-node add and concurrent GX adapter add	When multiple hot adds are planned that include node and GX adapter adds, the GX adapters should be installed in the node prior to the node being installed in the system.	Service representative
Hot-node add and concurrent GX adapter add	For multiple upgrades that include node or GX adapter adds, as well as I/O drawer adds, the node or GX adapter add must be completed first. The I/O drawer can then be added as a separate concurrent I/O drawer add.	Service representative
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	On systems with large amounts of memory, Reliable Scalable Cluster Technology (RSCT) PTF 3.1.0.4 must be downloaded from the Fix Central website ( <a href="http://www-933.ibm.com/support/fixcentral">http://www-933.ibm.com/support/fixcentral</a> ) and installed.	Customer Service representative must verify
Hot-node repair and hot GX adapter repair	Repairs must be done with the same field-replaceable unit (FRU) type.	Service representative
Hot-node repair and hot GX adapter repair	Hardware upgrades and downgrades are not supported during a repair operation.	Service representative

## Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD system firmware and HMC levels

Learn about the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD), and IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD) systems.

### Model 8412-EAD system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on the IBM Power ESE (8412-EAD) system.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

*Table 4. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for the 8412-EAD system*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 V7R7.6.0M2 (MH01335)
Memory addition or upgrade	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
GX adapter addition	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)

*Table 5. System firmware and HMC for repairs for the 8412-EAD system*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
Hot GX adapter repair	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch CEC drawer power supply and fan	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)

Table 5. System firmware and HMC for repairs for the 8412-EAD system (continued)

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
19-inch I/O drawer repair	AM760_068 or later	AM760_068 or later
This operation is supported on all 19-inch I/O expansion units	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)
Operator (control) panel replacement	AM760_068 or later	AM760_068 or later
	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)
PCI adapter replacement	AM760_068 or later	AM760_068 or later
	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)

### Model 9117-MMB and 9179-MHB system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMB) and IBM Power 780 (9179-MHB) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

Table 6. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMB and 9179-MHB systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM720_084 or later	AM720_113 or later
Supported FCs for 9117-MMB: 5659 (IBM), 5669 (OEM)	V7R7.2.0M3 (MH01298)	V7R7.2.0M3 (MH01298)
Supported FCs for 9179-MHB: 5597 (IBM), 5598 (OEM)	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)
Memory addition or upgrade	AM720_084 or later	AM720_113 or later
Standard FCs for 9117-MMB and 9179-MHB: 5600, 5601, 5602	V7R7.2.0M3 (MH01298)	V7R7.2.0M3 (MH01298)
Package FCs for 9117-MMB and 9179-MHB: none	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)
GX adapter addition	All levels	AM720_113 or later
Supported FCs for 9117-MMB and 9179-MHB: 1808	V7R7.2.0	V7R7.2.0M3 (MH01298)
	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)

Table 6. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMB and 9179-MHB systems (continued)

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
19-inch I/O expansion unit addition  This operation is supported on all 19-inch I/O expansion units  Supported FCs for 9117-MMB and 9179-MHB: 5796, 5802, 5877, 7314-G30	All levels	All levels
19-inch I/O drawer removal  Supported on all 19-inch I/O expansion units	All levels	All levels

Table 7. System firmware and HMC levels for repairs for 9117-MMB and 9179-MHB systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM720_084 or later  V7R7.2.0M3 (MH01298)  or  AM730_078 or later  V7R7.3.0M3 (MH01303)	AM720_113 or later  V7R7.2.0M3 (MH01298)  or  AM730_099 or later  V7R7.3.0M5 (MH01330)
Hot GX adapter repair	AM720_084 or later  V7R7.2.0M3 (MH01298)  or  AM730_078 or later  V7R7.3.0M3 (MH01303)	AM720_113 or later  V7R7.2.0M3 (MH01298)  or  AM730_099 or later  V7R7.3.0M5 (MH01330)
19-inch CEC drawer power supply and fan	All levels	All levels
19-inch I/O drawer repair  This operation is supported on all 19-inch I/O expansion units	All levels	All levels
Operator (control) panel replacement	All levels	All levels
PCI adapter replacement	All levels	All levels

### Model 9117-MMC and 9179-MHC system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMC) and IBM Power 780 (9179-MHC) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

*Table 8. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMC and 9179-MHC systems*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Memory addition or upgrade	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
GX adapter addition	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)

*Table 9. System firmware and HMC for repairs for 9117-MMC and 9179-MHC systems*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Hot GX adapter repair	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch CEC drawer power supply and fan	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O drawer repair This operation is supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Operator (control) panel replacement	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
PCI adapter replacement	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)

### **Model 9117-MMD and 9179-MHD system firmware and HMC levels**

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMD) and IBM Power 780 (9179-MHD) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

Table 10. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMD and 9179-MHD systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Memory addition or upgrade	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
GX adapter addition	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)

Table 11. System firmware and HMC for repairs for 9117-MMD and 9179-MHD systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Hot GX adapter repair	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch CEC drawer power supply and fan	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer repair This operation is supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Operator (control) panel replacement	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
PCI adapter replacement	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)

## Model 9119-FHB system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 795 (9119-FHB) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.



3. CEC is the central electronics complex.
4. CBU, or capacity back-up, indicates that the feature code includes conditions on usage as well as hardware.

*Table 12. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9119-FHB*

<b>Function</b>	<b>Minimum system firmware and HMC levels</b>	<b>Recommended system firmware and HMC levels</b>
Node add Supported FCs for the 9119-FHB chassis: Standard: 4700, 4702 CBU: 7560, 7562	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
Memory addition or upgrade Supported FCs: Standard: 5600, 5601, 5602	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
GX adapter addition Supported FCs: 1816	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
24-inch I/O expansion unit addition Supported FCs: 5798, 5797, 5803, 5873	All levels	All levels
24-inch I/O drawer removal Supported on all 24-inch I/O expansion units	All levels	All levels
Bulk power Supported FCs: 6954 (self-powered expansion rack with 6954 bolt-on rack)	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)

Table 13. System firmware and HMC levels for repairs for 9119-FHB

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
Hot GX adapter repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
System controller repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
24-inch I/O drawer repair  This operation is supported on all 24-inch I/O expansion units	All levels	All levels
Bulk power	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
PCI adapter replacement	All levels	All levels

## Service provider information for CEC hot-node add and hot-node repair maintenance operations

Service provider information details the tasks and related information on CEC hot-node add and hot-node repair maintenance operations for service representatives.

CEC hot-add and hot-repair tasks can be performed on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD), IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD), and IBM Power 795 (9119-FHB) systems that are managed by a Hardware Management Console (HMC). The CEC hot-add and hot-repair tasks that are supported on a single-node 9117-MMD or 9179-MHD system are also supported on the 8412-EAD systemyeah.

CEC hot-add and hot-repair tasks provide the capability to perform maintenance (repair, add, or upgrade) on field replaceable units (FRUs) within a CEC while the system is powered-on. Even though the system remains powered-on, there may be impacts to the partitions and the performance of the system. For example, when a CEC node is physically removed from the system to repair a FRU, the processors, memory, and I/O resources that the node hosts will no longer be available to the partitions. The impacts on a specific system configuration vary depending on a number of factors that include spare memory resources, spare processor resources, and I/O redundancy configuration (mirroring or multipath).

For more information about the CEC concurrent maintenance functions on Power 770, Power 780, and Power 795 systems, see the IBM® Power 770/780 and 795 Servers CEC Hot Add & Repair Maintenance Technical Overview white paper.

## Prerequisites for CEC hot-add and hot-repair

The following prerequisites apply to CEC hot-node add and hot-node repair maintenance operations.

1. Before performing a CEC hot-add or hot-repair operation, you must complete the CEC hot-add or hot-repair operation distance learning course.
2. Verify that the HMC level is the same as, or later than, the level that is shown in “Model 8412-EAD system firmware and HMC levels” on page 24, “Model 9117-MMB and 9179-MHB system firmware and HMC levels” on page 25, “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26, “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27, or “Model 9119-FHB system firmware and HMC levels” on page 28. If there are two HMCs attached to the system, both HMCs must be at the same level. If not, the HMC that is not at the required level must be correctly disconnected from the managed system and powered off.

For information about verifying the HMC code level and release, see *Determining your HMC code level and release*.

For information about disconnecting an HMC from a managed system, see *Removing HMC connection data*.

3. Carefully follow all ESD (electrostatic discharge) handling procedures.
4. When you perform multiple hot adds that include a node and GX adapter, the GX adapter must be installed in the node before the node is installed in the system. If this order is observed, the memory in the new node will be used for the 128 MB of memory that is required for the GX adapter. (The node must have approximately 128 MB of memory per GX adapter to support the adapter's translation control entry (TCE) table.) The GX adapter in the new node will be activated during the addition of the node (if the 128 MB memory requirement is met). If the GX adapter is installed after the new node is installed and activated, the plugging rules for GX adapters will be enforced. In this case, the GX adapter must be installed in another node with another hot add operation.

**Note:** All of the hot add and repair activities must be performed by a service representative.

Checklists are available that list the prerequisite planning tasks that are required before you perform hot maintenance.

## Special considerations for CEC hot-add and hot-repair

The following special considerations must be taken into account when you perform CEC hot-node add and hot-node repair maintenance operations.

1. Only a single hot add or repair operation can be performed at one time from a single HMC.
2. A second hot add or repair operation cannot be started until the first one completes without failure. If a hot operation fails, the same operation must be restarted and completed before you attempt another operation.
3. Multiple hot add or repair operations must be completed by doing a series of single hot add or repair operations.

## CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD

The planning checklists contain a list of tasks that must be completed before you perform CEC hot-node add and hot-node repair maintenance operations on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD) and IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD) systems. It also lists which tasks are associated with each type of operation.

For guidelines that apply to all CEC adapter hot-add and hot-repair maintenance operations, see “Prerequisites for CEC hot-add and hot-repair” on page 31. These general guidelines and the following checklist must be followed.

*Table 14. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD*

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node add	Ensure that sufficient space is available in the rack that contains the system for another node to be installed under the existing nodes.	Customer
Hot-node add	Adding a node increases the power requirements of the system. If necessary, the power circuits that supply the system must be upgraded to handle these additional power requirements. This upgrade must be complete before the hot-node add begins.  The power requirements of additional nodes are detailed in Chapter 4, <b>Server Specifications</b> and Chapter 8, <b>Planning for Power</b> in Site and Hardware Planning.	Customer responsibility to perform the required site planning activities
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	If the system is managed by a Hardware Management Console (HMC), verify that the HMC level is the same as, or later than, the level shown in “Model 8412-EAD system firmware and HMC levels” on page 24, “Model 9117-MMB and 9179-MHB system firmware and HMC levels” on page 25, “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26, or “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27.  Verify that the system firmware level is the same as, or later than, the level shown in “Model 8412-EAD system firmware and HMC levels” on page 24, “Model 9117-MMB and 9179-MHB system firmware and HMC levels” on page 25, “Model 9117-MMC and 9179-MHC system firmware and HMC levels” on page 26, or “Model 9117-MMD and 9179-MHD system firmware and HMC levels” on page 27.  For information about determining firmware levels using the Hardware Management Console (HMC), see Using the HMC to view the existing firmware levels.  For information about disconnecting an HMC from a managed system, see Removing HMC connection data.	Customer  Service representative must verify

Table 14. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node upgrade (memory), hot-node add, and hot-node repair	<p><b>CAUTION:</b></p> <p>Observe the following with the Symmetric Multiprocessing (SMP) and the service processor cables on IBM Power ESE, Power 770, and Power 780 systems when performing a CEC hot add or repair operation:</p> <ul style="list-style-type: none"> <li>• Verify that the SMP cable (on the front of the system) and the service processor cable (on the rear of the system) are layered correctly. See “Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer external SMP and FSP flex cabling” on page 45. Do not start the CEC hot add or repair operation if the layering is not correct. If the layering is not correct, schedule a system outage with the customer to correct the cabling and perform the CEC hot add or repair operation with the power turned off.</li> <li>• Do not disturb the SMP and the service processor cables on active nodes. If a node repair is being performed, remove only the cables on the node that is being repaired (powered off) unless otherwise directed by WCII instructions or the removal and replacement procedure.</li> </ul>	Service representative must verify
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If there is only one partition running on the system, the system can be powered down if that partition must be shut down during the CEC hot add or repair operation. To verify or change the setting that controls this behavior, see <b>System power off policy</b> in Powering the system on and off.	Service representative
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	<p>Verify that service processor redundancy is enabled, except on a system with a single node.</p> <p>To enable service processor redundancy on the managed system on an HMC, in the navigation area, select <b>Serviceability &gt; FSP Failover &gt; Setup</b>. Failover status is displayed in the contents area and can be enabled or disabled.</p> <p><b>Note:</b> The server must be power cycled for the enabling of service processor redundancy to take effect. If power cycling is required, the node can be added nonconcurrently (with power off).</p> <p>For information about redundancy on the HMC, see FSP Failover.</p>	Customer Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	If the system is managed by an HMC, verify the network connections between the system service processors and the HMC before the service representative arrives by using the service processor status function on the HMC. For information about testing the network connections on the HMC, see Testing the connection between the HMC and the managed system.	Customer Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	<p>Ensure that Electronic Service Agent (ESA) is enabled to <b>call home</b>.</p> <p>For additional details about the <b>call home</b> function on the HMC, see Manage Systems Call-Home.</p>	Customer Service representative must verify

Table 14. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Hot-node add, hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>For 9117-MMB and 9179-MHB systems, you should quiesce the server before the hot-node operation. This means that all critical application should be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt.</p> <p>For 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHC, and 9179-MHD systems, you must quiesce the server before the hot-node operation. This means that all critical applications must be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt.</p> <p>For additional information on a system managed by an HMC, see <b>Mobility</b> in the <b>Systems management for partitions</b> topic in <i>Managing the Hardware Management Console</i>.</p> <p><b>Note:</b> IBM recommends that adequate protection is in place for business critical applications before you perform CEC hot-node add and hot-node repair maintenance operations. To mitigate the possibility of an unexpected outage, you can manually move critical workloads to another server before the operation begins. Performing CEC hot-node add and hot-node repair maintenance operations during a regularly scheduled maintenance window or during off-peak hours reduces the impact of an unplanned outage.</p>	Customer
Hot-node add and hot-node upgrade (memory)	Obtain and apply Capacity Upgrade on Demand (CUoD) activation codes prior to the operation so that the memory resources are available immediately after the hot add operation. For information about CUoD activation codes, see Capacity Upgrade on Demand activation codes.	Customer
Hot-node add and hot-node upgrade (memory)	If the customer wants to dynamically add the new processors and memory resources to activated partitions after the Hot-node add, the profiles that were used to activate the partitions must have the maximums for memory set to the appropriate values. When the Hot-node add is complete, the processor and memory resources can be added to the partitions by using dynamic logical partitions (DLPAR). For information about DLPAR, see Dynamic logical partitioning.	Customer
Hot-node upgrade (memory)	Verify that more than one node is present in the system. Hot-node upgrade (memory) cannot be done if the system has only one node.	Customer Service representative must verify
Hot-node repair, hot GX adapter repair, and hot-node upgrade (memory)	Run the Preparing for Hot Repair or Upgrade utility on the HMC to determine if the system is prepared for a node upgrade (memory). For more information about the utility, see Preparing for hot repair or upgrade.	Customer Service representative must verify
Hot-node add and concurrent GX adapter add	System firmware enforces the node and GX adapter plugging order. Only the next GX adapter slot or node position based on the plugging order is available.	Customer Service representative must verify

Table 14. CEC hot-node add and hot-node repair maintenance operations checklists for models 8412-EAD, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD (continued)

Operations	Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD tasks	Responsibility
Concurrent GX adapter add	Ensure that there is a GX adapter slot reservation for each GX adapter that is being added. Each installed GX adapter and GX adapter slot reservation consumes approximately 128 MB of memory. Additional GX adapter slots can be reserved by using the Advanced System Management Interface (ASMI). New GX adapter slot reservations take effect the next time the system is powered on.	Customer
Concurrent GX adapter add	The GX adapter cannot be added to a node that has been deconfigured. The node must be repaired and reconfigured before another GX adapter can be added. To verify that all nodes in the system are configured, see Using the ASMI to view deconfigured resources.	Customer Service representative must verify onsite <sup>1</sup>
Hot-node add	When multiple hot adds are planned that include node and GX adapter adds, the GX adapter(s) should be installed in the node before the node is installed in the system.	Service representative
Hot-node add and concurrent GX adapter add	For multiple upgrades that include node or GX adapter adds, as well as I/O drawer adds, the node or GX adapter add must be completed first. The I/O drawer can then be added as a separate concurrent I/O drawer add.	Service representative
Hot-node repair and hot GX adapter repair	Ensure that the replacement parts are the same type as the parts that are being removed.	Service representative
Hot-node repair and hot GX adapter repair	Replace only the existing parts. New hardware must not be added during a Hot-node repair or a hot GX adapter repair.	Service representative
Hot-node repair	Ensure that existing node hardware is not moved during the Hot-node repair.	Service representative
<sup>1</sup> Hardware in a node can fail at any time. When this happens a node can become unconfigured during system IPL to isolate the failure. The failure and unconfigured event can occur after the hardware upgrade package has arrived at the customer site and the service representative has been dispatched. The service representative must ask the customer if the system has any outstanding deferred repairs. <b>Note:</b> The hot-node add function adds and enables the I/O adapters only in the new node.		

## CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB

The planning checklists contain a list of tasks that must be completed before you perform CEC hot-node add and hot-node repair maintenance operations on an IBM Power 795 (9119-FHB) system. It also lists which tasks are associated with each type of operation.

For guidelines that apply to all CEC adapter hot-add and hot-repair maintenance operations, see “Prerequisites for CEC hot-add and hot-repair” on page 31. These general guidelines and the following checklist must be followed.

Table 15. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB

Operations	Model 9119-FHB tasks	Responsibility
Hot-node add, hot-node upgrade (memory), and hot-node repair	Engineering change announcement (ECA) 256 must be installed on the system before starting a CEC hot-node add and hot-node repair maintenance operation. This ECA ensures that the system controllers are at the minimum hardware EC level that is required to perform one of these operations on a model 9119-FHB. Contact your authorized service provider for more information on ECA 256.	Customer  Service representative must verify
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	If the system is managed by a Hardware Management Console (HMC), verify that the HMC level is the same as, or later than, the level shown in “Model 9119-FHB system firmware and HMC levels” on page 28.  Verify that the system firmware level is the same as, or later than, the level shown in “Model 9119-FHB system firmware and HMC levels” on page 28.  For information about determining firmware levels using the Hardware Management Console (HMC), see Using the HMC to view the existing firmware levels.  For information about disconnecting an HMC from a managed system, see Removing HMC connection data.	Customer  Service representative must verify
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If the system has one or more partitions running IBM i, PTF MF52971 must be must be downloaded from the Fix Central website ( <a href="http://www-933.ibm.com/support/fixcentral">http://www-933.ibm.com/support/fixcentral</a> ) and installed.	Customer  Service representative must verify
Hot-node add, hot-node upgrade (memory), and concurrent GX adapter add	All serviceable hardware events must be repaired and closed before starting a hot add or upgrade operation. This eliminates the possibility that an existing hardware failure will cause the hot add operation to fail. The existing nodes in the system must be in a functional state before a hot-node add operation.	Service representative
Hot-node repair and hot GX adapter repair	Other hardware serviceable events outside of the CEC must be repaired before starting a hot repair operation. This eliminates the possibility of other hardware failures interfering with the hot repair operation.	Service representative
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<ul style="list-style-type: none"> <li>The Prepare for Hot Repair or Upgrade (PHRU) utility must be run by the system administrator to determine the processor, memory and I/O resources that need to be freed.</li> <li>All resources identified by the PHRU utility must be freed up by the system administrator prior to the start of hot upgrade or repair procedure by the SSR.</li> </ul>	Customer  Service representative must verify
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	If there is only one partition running on the system, the system can be powered down if that partition must be shut down during the CEC hot add or repair operation. To verify or change the setting that controls this behavior, see <b>System power off policy</b> in <b>Controlling the system power using the ASMI</b> at Managing the Advanced System Management Interface.	Service representative



Table 15. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB (continued)

Operations	Model 9119-FHB tasks	Responsibility
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>Verify that service processor redundancy is enabled.</p> <p>To enable service processor redundancy on the managed system on an HMC, in the navigation area, select <b>Serviceability &gt; FSP Failover &gt; Setup</b>. Failover status is displayed in the contents area and can be enabled or disabled.</p> <p><b>Note:</b> The server must be power cycled for the enabling of service processor redundancy to take effect. If power cycling is required, the node can be added nonconcurrently (with power off).</p> <p>For information about redundancy on the HMC, see FSP Failover.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>If the system is managed by an HMC, verify the network connections between the system service processors and the HMC before the service representative arrives by using the service processor status function on the HMC. For information about testing the network connections on the HMC, see Testing the connection between the HMC and the managed system.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, hot GX adapter repair	<p>Ensure that Electronic Service Agent (ESA) is enabled to <b>call home</b>.</p> <p>For additional details about the <b>call home</b> function on the HMC, see Manage Systems Call-Home.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add, hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>For 9119-FHB systems, you should quiesce the server before the hot-node operations. This means that all critical applications must be halted or moved to another server using Live Partition Mobility (LPM) before the operation begins. Noncritical applications can be left running. The partitions can be left running at the operating system command prompt. For additional information on a system managed by an HMC, see <b>Mobility</b> in the <b>Systems management for partitions</b> topic in Managing the Hardware Management Console.</p>	<p>Customer</p>
Hot-node upgrade (memory)	<p>Verify that more than one node is present in the system. Hot-node upgrade (memory) cannot be done if the system has only one node.</p>	<p>Customer</p> <p>Service representative must verify</p>
Hot-node add and hot-node upgrade (memory)	<p>Obtain and apply Capacity Upgrade on Demand (CUoD) activation codes prior to the operation so that the memory resources are available immediately after the hot add operation. For information about CUoD activation codes, see Capacity Upgrade on Demand activation codes.</p>	<p>Customer</p>
Hot-node upgrade (memory)	<p>If the customer wants to dynamically add the new processors and memory resources to activated partitions after the hot-node add, the profiles that were used to activate the partitions must have the maximums for memory set to the appropriate values. When the hot-node add is complete, the processor and memory resources can be added to the partitions using dynamic logical partitions (DLPAR). For information about DLPAR, see Dynamic logical partitioning.</p>	<p>Customer</p>

Table 15. CEC hot-node add and hot-node repair maintenance operations checklists for model 9119-FHB (continued)

Operations	Model 9119-FHB tasks	Responsibility
Hot-node upgrade (memory), hot-node repair, and hot GX adapter repair	<p>Features and capabilities that do not support resource relocation, which is required for a hot-node upgrade (memory), hot-node repair, and GX adapter repair:</p> <ul style="list-style-type: none"> <li>• Systems clustered using RIO-SAN technology. This technology is used only by IBM i customers with clustered systems using switchable towers and virtual OptiConnect technologies.</li> <li>• Systems clustered using InfiniBand technology. This capability is typically used by high performance computing customers using an InfiniBand switch.</li> <li>• I/O Processors (IOPs) used by IBM i partitions do not support node evacuation. Any IBM i partition that has an IOP assigned must either have the IOP powered off, or the partition must be powered off.</li> <li>• Memory pages of 16 GB, also known as huge pages, do not support memory relocation. Partitions with 16 GB pages must be powered off to allow CEC hot-node add and hot-node repair maintenance operations.</li> </ul>	Customer
Hot-node add and concurrent GX adapter add	System firmware enforces the node and GX adapter plugging order. Only the next GX adapter slot or node position based on the plugging order is available.	Customer Service representative must verify
Concurrent GX adapter add	Ensure that there is a GX adapter slot reservation for each GX adapter that is being added. Each installed GX adapter and GX adapter slot reservation consumes approximately 128 MB of memory. Additional GX adapter slots can be reserved using the Advanced System Management Interface (ASMI). New GX adapter slot reservations take effect the next time the system is powered on.	Customer
Hot-node add and concurrent GX adapter add	When multiple hot adds are planned that include node and GX adapter adds, the GX adapters should be installed in the node prior to the node being installed in the system.	Service representative
Hot-node add and concurrent GX adapter add	For multiple upgrades that include node or GX adapter adds, as well as I/O drawer adds, the node or GX adapter add must be completed first. The I/O drawer can then be added as a separate concurrent I/O drawer add.	Service representative
Hot-node add, hot-node upgrade (memory), hot-node repair, concurrent GX adapter add, and hot GX adapter repair	On systems with large amounts of memory, Reliable Scalable Cluster Technology (RSCT) PTF 3.1.0.4 must be downloaded from the Fix Central website ( <a href="http://www-933.ibm.com/support/fixcentral">http://www-933.ibm.com/support/fixcentral</a> ) and installed.	Customer Service representative must verify
Hot-node repair and hot GX adapter repair	Repairs must be done with the same field-replaceable unit (FRU) type.	Service representative
Hot-node repair and hot GX adapter repair	Hardware upgrades and downgrades are not supported during a repair operation.	Service representative

## Model 8412-EAD, 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD system firmware and HMC levels

Learn about the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power ESE (8412-EAD), IBM Power 770 (9117-MMB, 9117-MMC, and 9117-MMD), and IBM Power 780 (9179-MHB, 9179-MHC, and 9179-MHD) systems.

### Model 8412-EAD system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on the IBM Power ESE (8412-EAD) system.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

*Table 16. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for the 8412-EAD system*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 V7R7.6.0M2 (MH01335)
Memory addition or upgrade	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
GX adapter addition	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)

*Table 17. System firmware and HMC for repairs for the 8412-EAD system*

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
Hot GX adapter repair	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)
19-inch CEC drawer power supply and fan	AM760_068 or later V7R7.6.0M2 (MH01335)	AM760_068 or later V7R7.6.0M2 (MH01335)

Table 17. System firmware and HMC for repairs for the 8412-EAD system (continued)

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
19-inch I/O drawer repair	AM760_068 or later	AM760_068 or later
This operation is supported on all 19-inch I/O expansion units	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)
Operator (control) panel replacement	AM760_068 or later	AM760_068 or later
	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)
PCI adapter replacement	AM760_068 or later	AM760_068 or later
	V7R7.6.0M2 (MH01335)	V7R7.6.0M2 (MH01335)

### Model 9117-MMB and 9179-MHB system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMB) and IBM Power 780 (9179-MHB) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

Table 18. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMB and 9179-MHB systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM720_084 or later	AM720_113 or later
Supported FCs for 9117-MMB: 5659 (IBM), 5669 (OEM)	V7R7.2.0M3 (MH01298)	V7R7.2.0M3 (MH01298)
Supported FCs for 9179-MHB: 5597 (IBM), 5598 (OEM)	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)
Memory addition or upgrade	AM720_084 or later	AM720_113 or later
Standard FCs for 9117-MMB and 9179-MHB: 5600, 5601, 5602	V7R7.2.0M3 (MH01298)	V7R7.2.0M3 (MH01298)
Package FCs for 9117-MMB and 9179-MHB: none	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)
GX adapter addition	All levels	AM720_113 or later
Supported FCs for 9117-MMB and 9179-MHB: 1808	V7R7.2.0	V7R7.2.0M3 (MH01298)
	or AM730_078 or later	or AM730_099 or later
	V7R7.3.0M3 (MH01303)	V7R7.3.0M5 (MH01330)

Table 18. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMB and 9179-MHB systems (continued)

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
19-inch I/O expansion unit addition  This operation is supported on all 19-inch I/O expansion units  Supported FCs for 9117-MMB and 9179-MHB: 5796, 5802, 5877, 7314-G30	All levels	All levels
19-inch I/O drawer removal  Supported on all 19-inch I/O expansion units	All levels	All levels

Table 19. System firmware and HMC levels for repairs for 9117-MMB and 9179-MHB systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM720_084 or later  V7R7.2.0M3 (MH01298)  or  AM730_078 or later  V7R7.3.0M3 (MH01303)	AM720_113 or later  V7R7.2.0M3 (MH01298)  or  AM730_099 or later  V7R7.3.0M5 (MH01330)
Hot GX adapter repair	AM720_084 or later  V7R7.2.0M3 (MH01298)  or  AM730_078 or later  V7R7.3.0M3 (MH01303)	AM720_113 or later  V7R7.2.0M3 (MH01298)  or  AM730_099 or later  V7R7.3.0M5 (MH01330)
19-inch CEC drawer power supply and fan	All levels	All levels
19-inch I/O drawer repair  This operation is supported on all 19-inch I/O expansion units	All levels	All levels
Operator (control) panel replacement	All levels	All levels
PCI adapter replacement	All levels	All levels

### Model 9117-MMC and 9179-MHC system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMC) and IBM Power 780 (9179-MHC) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

Table 20. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMC and 9179-MHC systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Memory addition or upgrade	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
GX adapter addition	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)

Table 21. System firmware and HMC for repairs for 9117-MMC and 9179-MHC systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Hot GX adapter repair	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch CEC drawer power supply and fan	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
19-inch I/O drawer repair This operation is supported on all 19-inch I/O expansion units	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
Operator (control) panel replacement	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)
PCI adapter replacement	AM740_075 or later V7R7.4.0M1 (MH01297)	AM740_098 or later V7R7.4.0M3 (MH01333)

### Model 9117-MMD and 9179-MHD system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 770 (9117-MMD) and IBM Power 780 (9179-MHD) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.
3. CEC is the central electronics complex.

Table 22. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9117-MMD and 9179-MHD systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Node add	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Memory addition or upgrade	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
GX adapter addition	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O expansion unit addition This operation is supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer removal Supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)

Table 23. System firmware and HMC for repairs for 9117-MMD and 9179-MHD systems

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Hot GX adapter repair	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch CEC drawer power supply and fan	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
19-inch I/O drawer repair This operation is supported on all 19-inch I/O expansion units	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
Operator (control) panel replacement	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)
PCI adapter replacement	AM760_062 or later V7R7.6.0M2 (MH01335)	AM760_062 or later V7R7.6.0M2 (MH01335)

## Model 9119-FHB system firmware and HMC levels

This information provides the minimum and recommended system firmware and Hardware Management Console (HMC) levels for CEC hot-node add and hot-node repair maintenance operations on IBM Power 795 (9119-FHB) systems.

**Notes:** The following terms and abbreviations are used in the following tables.

1. FC is the abbreviation for feature code.
2. Package is a bundle of feature codes of the same type.

3. CEC is the central electronics complex.
4. CBU, or capacity back-up, indicates that the feature code includes conditions on usage as well as hardware.

*Table 24. System firmware and HMC levels for hot node add, hot memory addition or upgrade, hot GX adapter additions, and drawer additions and removals for 9119-FHB*

<b>Function</b>	<b>Minimum system firmware and HMC levels</b>	<b>Recommended system firmware and HMC levels</b>
Node add Supported FCs for the 9119-FHB chassis: Standard: 4700, 4702 CBU: 7560, 7562	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
Memory addition or upgrade Supported FCs: Standard: 5600, 5601, 5602	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
GX adapter addition Supported FCs: 1816	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
24-inch I/O expansion unit addition Supported FCs: 5798, 5797, 5803, 5873	All levels	All levels
24-inch I/O drawer removal Supported on all 24-inch I/O expansion units	All levels	All levels
Bulk power Supported FCs: 6954 (self-powered expansion rack with 6954 bolt-on rack)	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)



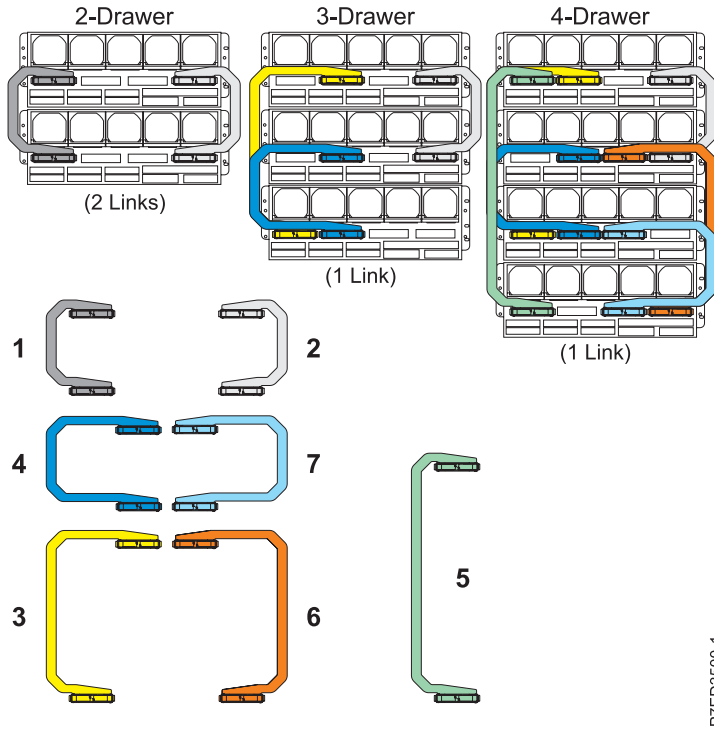
Table 25. System firmware and HMC levels for repairs for 9119-FHB

Function	Minimum system firmware and HMC levels	Recommended system firmware and HMC levels
Hot node repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
Hot GX adapter repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
System controller repair	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
24-inch I/O drawer repair  This operation is supported on all 24-inch I/O expansion units	All levels	All levels
Bulk power	AH730_035 or later V7R7.3.0 (MH01257) or AH760_043 or later V7R7.6.0 (MH01328)	AH730_099 or later V7R7.3.0M5 (MH01330) or AH760_043 or later V7R7.6.0M1 (MH01329)
PCI adapter replacement	All levels	All levels

## Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer external SMP and FSP flex cabling

Learn how to properly connect the external symmetric multiprocessor (SMP) and flexible service processor (FSP) flex cables to 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer systems.

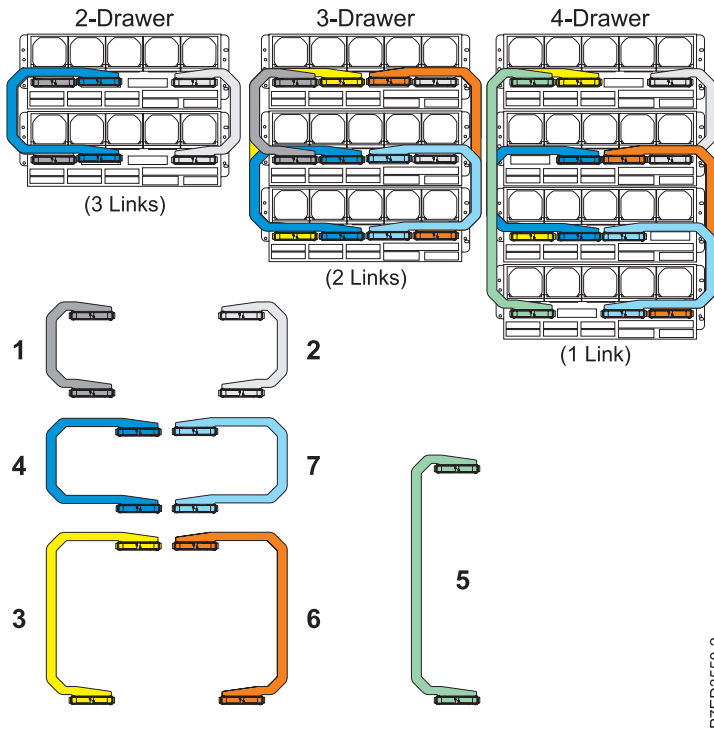
Figure 11 on page 46 shows the configuration of the front SMP flex cables for 9117-MMB, 9117-MMC, 9179-MHB, and 9179-MHC systems with a two socket central processing unit (CPU) card.



P7ED3500-1

Figure 11. Model 9117-MMB, 9117-MMC, 9179-MHB, and 9179-MHC multidrawer (two socket CPU card) SMP flex cabling

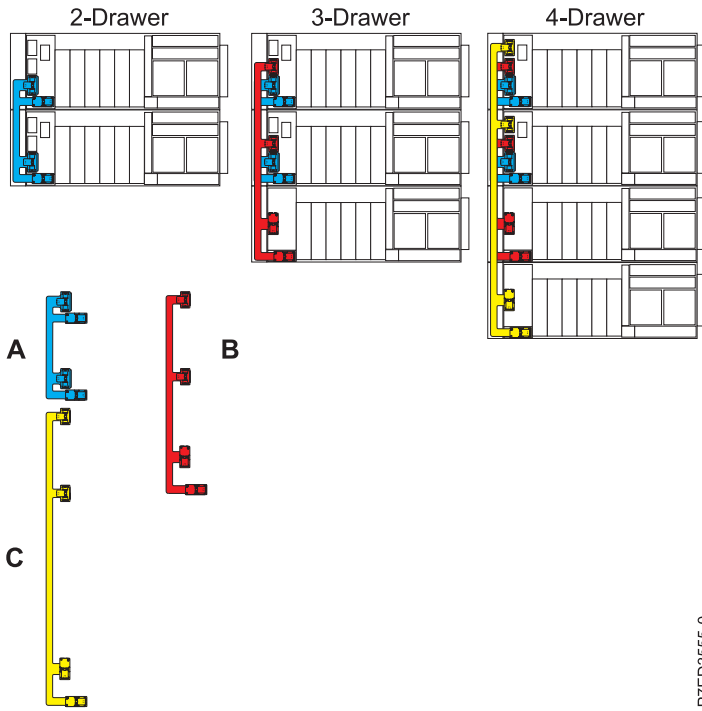
Figure 12 shows the configuration of the front SMP flex cables for 9117-MMD, 9179-MHC, and 9179-MHD systems with a four socket CPU card.



P7ED3550-2

Figure 12. Model 9117-MMD, 9179-MHC, and 9179-MHD multidrawer (four socket CPU card) SMP flex cabling

Figure 13 shows the configuration of the rear FSP flex cables for all 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD systems.



P7ED3655-0

Figure 13. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer FSP flex cabling

Figure 14 on page 48 shows the front SMP and rear FSP flex cabling location codes for all 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD systems.

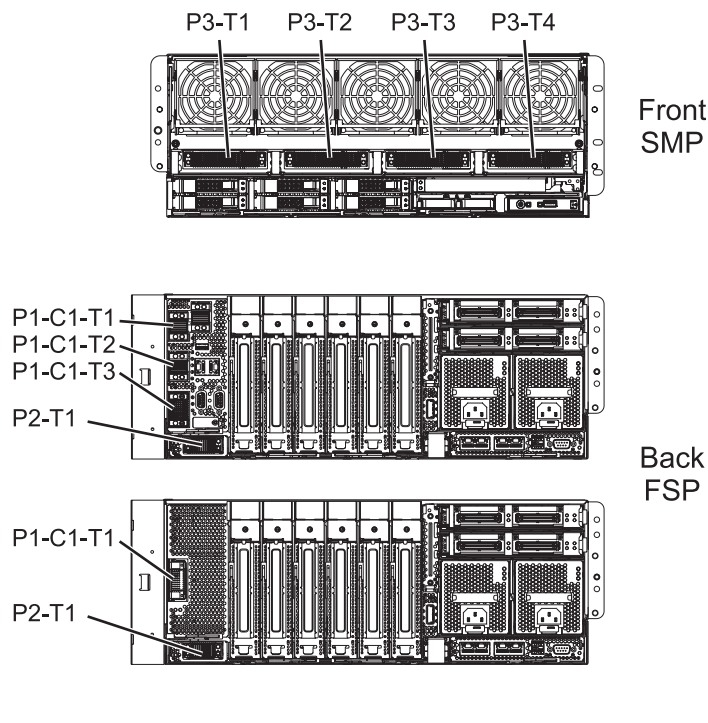


Figure 14. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD multidrawer flex cabling connector location codes. The front of the server with SMP connector location codes is shown in the first illustration in this figure. The back of the server for systems that have an FSP card (CCIN 2BBB) installed is shown in the middle illustration in this figure. The back of the server for systems that have a passthru card (CCIN 2BBC) installed is shown in the bottom illustration in this figure.

### CEC hot-node add and hot-node repair maintenance on a two drawer system with a two socket CPU card - Front

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of either drawer 1 or drawer 2. This procedure is not necessary for hard disk drive, storage media, or assembly.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove SMP flex assembly 1.
4. Remove SMP flex assembly 2.
5. Perform any necessary maintenance operations.
6. Reinstall SMP flex assembly 1 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 2.
7. Reinstall SMP flex assembly 2 to connector P3-T4 on drawer 1 and to connector P3-T4 on drawer 2.
8. Reinstall the front bezel on drawer 1.
9. Reinstall the front bezel on drawer 2.

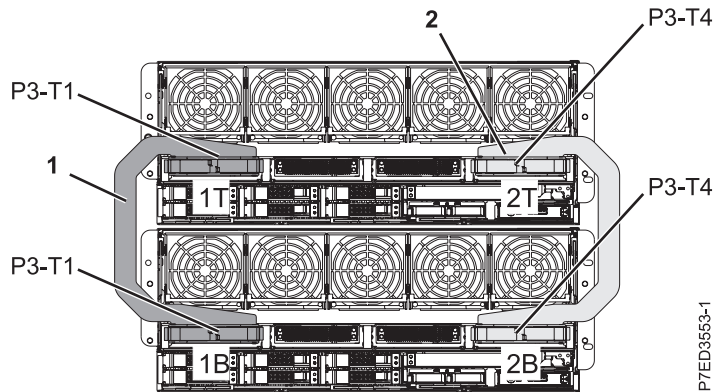


Figure 15. Model 9117-MMB, 9117-MMC, 9179-MHB, and 9179-MHC two drawer flex cabling (two socket CPU card)

### CEC hot-node add and hot-node repair maintenance on a two drawer system with a four socket CPU card - Front

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of either drawer 1 or drawer 2. This procedure is not necessary for hard disk drive, storage media, or assembly.

**Note:** This procedure applies to the following systems:

- Model 9117-MMD systems that have feature code (FC) EPM0 or EPM1 and custom card identification number (CCIN) AAF4 or AAF6 installed.
- Model 9179-MHC systems that have FC EP24 and CCIN 53A5 installed.
- Model 9179-MHD systems that have FC EPH0 or EPH2 and CCIN 54A8 or 54B4 installed.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove SMP flex assembly 4.
4. Remove SMP flex assembly 1.
5. Remove SMP flex assembly 2.
6. Perform any necessary maintenance operations.
7. Reinstall SMP flex assembly 2 to connector P3-T4 on drawer 1 and to connector P3-T4 on drawer 2.
8. Reinstall SMP flex assembly 1 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 2.
9. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 1 and to connector P3-T2 on drawer 2.
10. Reinstall the front bezel on drawer 1.
11. Reinstall the front bezel on drawer 2.

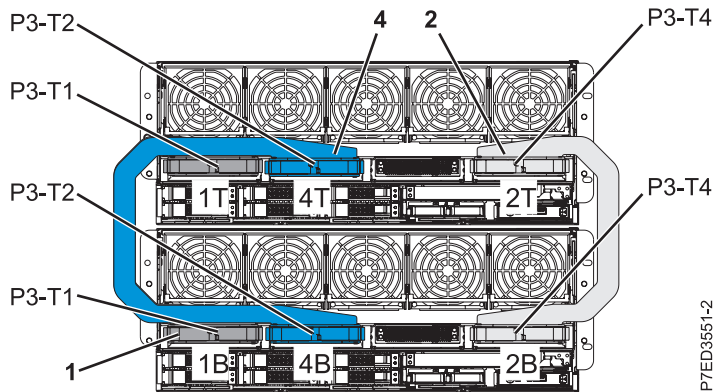


Figure 16. Model 9117-MMD, 9179-MHC, and 9179-MHD two drawer flex cabling (four socket CPU card)

### CEC hot-node add and hot-node repair maintenance on a two drawer system - Rear

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of either drawer 1 or drawer 2.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 1.
2. Remove the FSP cover from drawer 2.
3. Remove the FSP flex assembly A.
4. Perform any necessary maintenance operations.
5. Reconnect FSP flex assembly A to connector P2-T1 on drawer 1 and to connector P2-T1 on drawer 2.
6. Reconnect FSP flex assembly A to connector P1-C1-T3 on drawer 1 and to connector P1-C1-T3 on drawer 2.
7. Reinstall the FSP cover on drawer 1.
8. Reinstall the FSP cover on drawer 2.

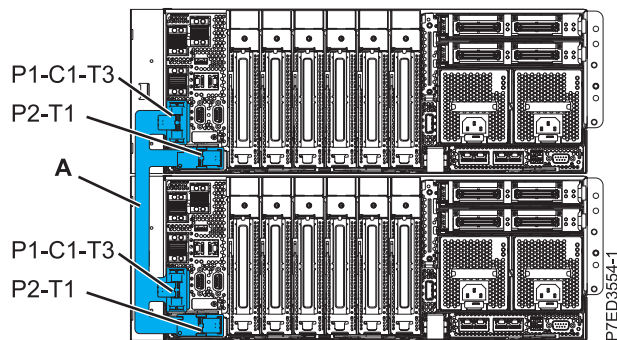


Figure 17. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD two drawer flex cabling - rear

### **CEC hot-node add and hot-node repair maintenance on a three drawer system with a two socket CPU card - Drawer 1 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 1. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 18 on page 52.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove SMP flex assembly 2.
4. Disconnect SMP flex assembly latch 3T from connector P3-T2 on drawer 1.
5. Bend the SMP flex assembly out of the way.
6. Perform any necessary maintenance operations.
7. Reconnect SMP flex assembly latch 3T to connector P3-T2 on drawer 1.
8. Reinstall SMP flex assembly 2 to connector P3-T4 on drawer 1 and to connector P3-T4 on drawer 2.
9. Reinstall the front bezel on drawer 1.
10. Reinstall the front bezel on drawer 2.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system with a two socket CPU card - Drawer 2 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 2. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 18 on page 52.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove the front bezel from drawer 3.
4. Remove SMP flex assembly 2.
5. Remove SMP flex assembly 4.
6. Perform any necessary maintenance operations.
7. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 2 and to connector P3-T2 on drawer 3.
8. Reinstall SMP flex assembly 2 to connector P3-T4 on drawer 1 and to connector P3-T4 on drawer 2.
9. Reinstall the front bezel on drawer 1.
10. Reinstall the front bezel on drawer 2.
11. Reinstall the front bezel on drawer 3.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system with a two socket CPU card - Drawer 3 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 3. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 18 on page 52.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove the front bezel from drawer 3.
4. Remove SMP flex assembly 4.
5. Remove SMP flex assembly 3.
6. Perform any necessary maintenance operations.
7. Reinstall SMP flex assembly 3 to connector P3-T2 on drawer 1 and to connector P3-T1 on drawer 3.
8. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 2 and to connector P3-T2 on drawer 3.

9. Reinstall the front bezel on drawer 1.
10. Reinstall the front bezel on drawer 2.
11. Reinstall the front bezel on drawer 3.

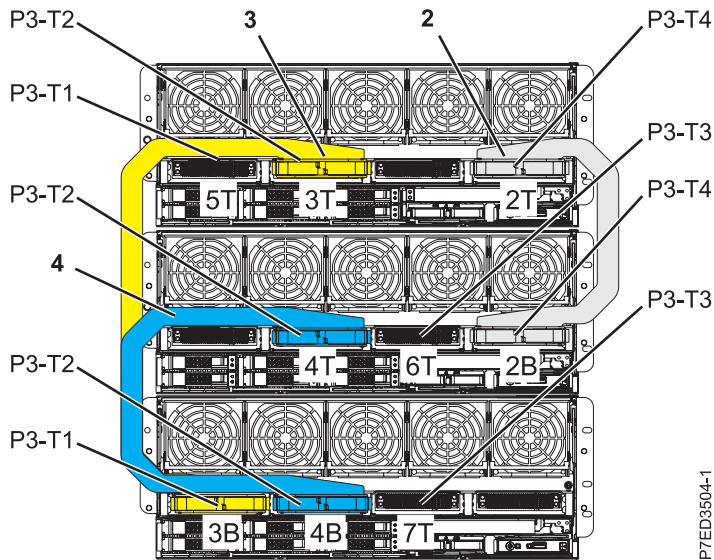


Figure 18. Model 9117-MMB, 9117-MMC, 9179-MHB, and 9179-MHC three drawer flex cabling (two socket CPU card) - front

### CEC hot-node add and hot-node repair maintenance on a three drawer system with a four socket CPU card - Drawer 1 front

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 1. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 19 on page 54.

**Note:** This procedure applies to the following systems:

- Model 9117-MMD systems that have feature code (FC) EPM0 or EPM1 and custom card identification number (CCIN) AAF4 or AAF6 installed.
- Model 9179-MHC systems that have FC EP24 and CCIN 53A5 installed.
- Model 9179-MHD systems that have FC EPH0 or EPH2 and CCIN 54A8 or 54B4 installed.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Disconnect SMP flex assembly 2T from drawer 1.
4. Remove SMP flex assembly 1.
5. Disconnect SMP flex assembly latch 3T from drawer 1.
6. Disconnect SMP flex assembly latch 6T from drawer 1.
7. Bend the SMP flex assemblies out of the way.
8. Perform any necessary maintenance operations.
9. Reconnect SMP flex assembly latch 6T to connector P3-T3 on drawer 1.
10. Reconnect SMP flex assembly latch 3T to connector P3-T2 on drawer 1.
11. Reinstall SMP flex assembly 1 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 2.
12. Reconnect SMP flex assembly 2T to connector P3-T4 on drawer 1.
13. Reinstall the front bezel on drawer 1.



14. Reinstall the front bezel on drawer 2.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system with a four socket CPU card - Drawer 2 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 2. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 19 on page 54.

**Note:** This procedure applies to the following systems:

- Model 9117-MMD systems that have feature code (FC) EPM0 or EPM1 and custom card identification number (CCIN) AAF4 or AAF6 installed.
  - Model 9179-MHC systems that have FC EP24 and CCIN 53A5 installed.
  - Model 9179-MHD systems that have FC EPH0 or EPH2 and CCIN 54A8 or 54B4 installed.
1. Remove the front bezel from drawer 1.
  2. Remove the front bezel from drawer 2.
  3. Remove the front bezel from drawer 3.
  4. Remove SMP flex assembly 7.
  5. Remove SMP flex assembly 1.
  6. Remove SMP flex assembly 4.
  7. Disconnect SMP flex assembly latch 2B from drawer 2 .
  8. Bend the SMP flex assembly out of the way.
  9. Perform any necessary maintenance operations.
  10. Reconnect SMP flex assembly latch 2B to connector P3-T4 on drawer 2.
  11. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 2 and to connector P3-T2 on drawer 3.
  12. Reinstall SMP flex assembly 1 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 2.
  13. Reinstall SMP flex assembly 7 to connector P3-T3 on drawer 2 and to connector P3-T3 on drawer 3.
  14. Reinstall the front bezel on drawer 1.
  15. Reinstall the front bezel on drawer 2.
  16. Reinstall the front bezel on drawer 3.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system with a four socket CPU card - Drawer 3 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 3. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 19 on page 54.

**Note:** This procedure applies to the following systems:

- Model 9117-MMD systems that have feature code (FC) EPM0 or EPM1 and custom card identification number (CCIN) AAF4 or AAF6 installed.
  - Model 9179-MHC systems that have FC EP24 and CCIN 53A5 installed.
  - Model 9179-MHD systems that have FC EPH0 or EPH2 and CCIN 54A8 or 54B4 installed.
1. Remove the front bezel from drawer 1.
  2. Remove the front bezel from drawer 2.
  3. Remove the front bezel from drawer 3.
  4. Remove SMP flex assembly 7.
  5. Remove SMP flex assembly 6.
  6. Disconnect SMP flex assembly 4B from drawer 3.

7. Disconnect SMP flex assembly 3B from drawer 3.
8. Perform any necessary maintenance operations.
9. Reconnect SMP flex assembly 3B to connector P3-T1 on drawer 3.
10. Reconnect SMP flex assembly 4B to connector P3-T2 on drawer 3.
11. Reinstall SMP flex assembly 6 to connector P3-T3 on drawer 1 and to connector P3-T4 on drawer 3.
12. Reinstall SMP flex assembly 7 to connector P3-T3 on drawer 2 and to connector P3-T3 on drawer 3.
13. Reinstall the front bezel on drawer 1.
14. Reinstall the front bezel on drawer 2.
15. Reinstall the front bezel on drawer 3.

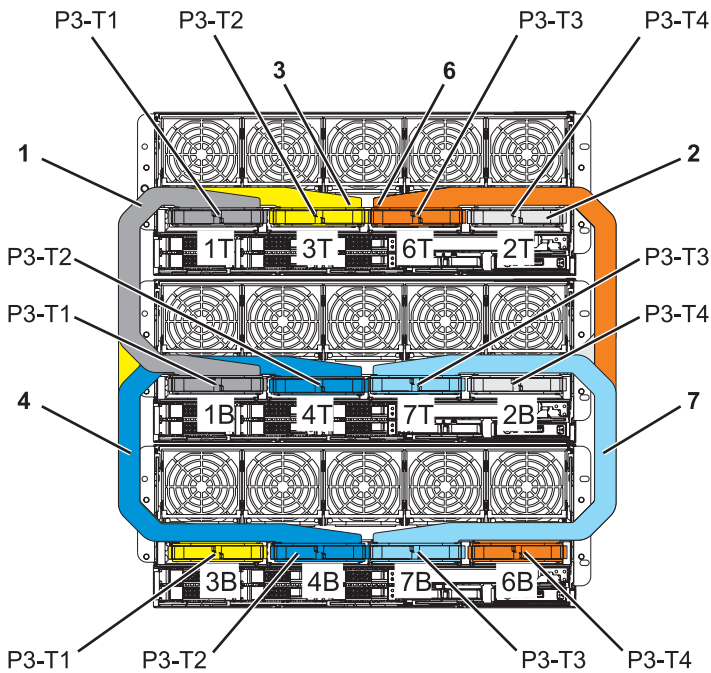


Figure 19. Model 9117-MMD, 9179-MHC, and 9179-MHD three drawer flex cabling (four socket CPU card) - front

### CEC hot-node add and hot-node repair maintenance on a three drawer system - Drawer 1 rear

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 1. For information about FSP flex assembly locations and codes, see Figure 20 on page 56.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 1.
2. Remove the FSP cover from drawer 2.
3. Disconnect FSP flex assembly B connector P1-C1-T2 from drawer 1.
4. Disconnect FSP flex assembly A connectors P1-C1-T3 and P2-T1 from drawer 1.
5. Bend the FSP flex assembly out of the way.
6. Perform any necessary maintenance operations.
7. Reconnect FSP flex assembly A connector P2-T1 to drawer 1.
8. Reconnect FSP flex assembly A connector P1-C1-T3 to drawer 1.
9. Reconnect FSP flex assembly B connector P1-C1-T2 to drawer 1.

10. Reinstall the FSP cover on drawer 1.
11. Reinstall the FSP cover on drawer 2.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system - Drawer 2 rear**

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 2. For information about FSP flex assembly locations and codes, see Figure 20 on page 56.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 1.
2. Remove the FSP cover from drawer 2.
3. Remove the FSP cover from drawer 3.
4. Disconnect FSP flex assembly B connector P1-C1-T2 from drawer 2.
5. Disconnect FSP flex assembly A connectors P1-C1-T3 and P2-T1 from drawer 2.
6. Bend the three FSP flex assembly connectors out of the way.
7. Perform any necessary maintenance operations.
8. Reconnect FSP flex assembly A connector P2-T1 to drawer 2.
9. Reconnect FSP flex assembly A connector P1-C1-T3 to drawer 2.
10. Reconnect FSP flex assembly B connector P1-C1-T2 to drawer 2.
11. Reinstall the FSP cover on drawer 1.
12. Reinstall the FSP cover on drawer 2.
13. Reinstall the FSP cover on drawer 3.

### **CEC hot-node add and hot-node repair maintenance on a three drawer system - Drawer 3 rear**

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 3. For information about FSP flex assembly locations and codes, see Figure 20 on page 56.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 2.
2. Remove the FSP cover from drawer 3.
3. Disconnect FSP flex assembly B connectors P1-C1-T1 and P2-T1 from drawer 3.
4. Bend the FSP flex assembly out of the way.
5. Perform any necessary maintenance operations.
6. Reconnect FSP flex assembly B connector P2-T1 to drawer 3.
7. Reconnect FSP flex assembly B connector P1-C1-T1 to drawer 3.
8. Reinstall the FSP cover on drawer 2.
9. Reinstall the FSP cover on drawer 3.

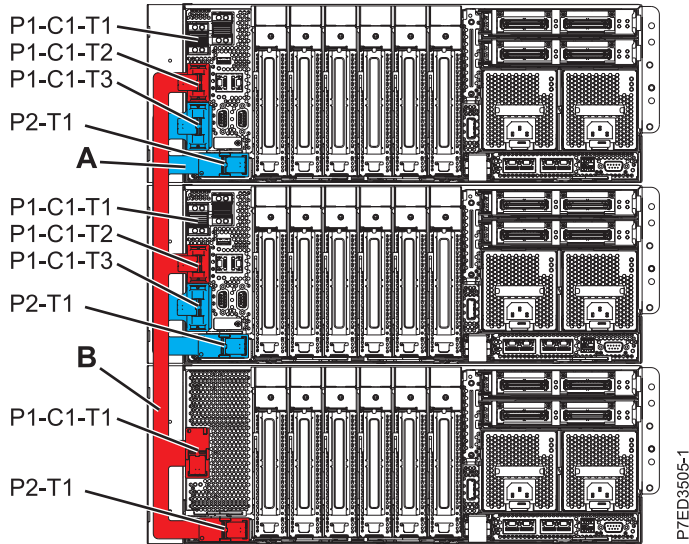


Figure 20. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD three drawer flex cabling - rear

### CEC hot-node add and hot-node repair maintenance on a four drawer system with a two or four socket CPU card - Drawer 1 front

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 1. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 21 on page 58.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove the front bezel from drawer 3.
4. Remove the front bezel from drawer 4.
5. Remove SMP flex assembly 5.
6. Disconnect SMP flex assembly latch 3T from drawer 1.
7. Disconnect SMP flex assembly latch 2T from drawer 1.
8. Bend both the SMP flex assemblies out of the way.
9. Perform any necessary maintenance operations.
10. Reconnect SMP flex assembly latch 2T to connector P3-T4 on drawer 1.
11. Reconnect SMP flex assembly latch 3T to connector P3-T2 on drawer 1.
12. Reinstall SMP flex assembly 5 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 4.
13. Reinstall the front bezel on drawer 1.
14. Reinstall the front bezel on drawer 2.
15. Reinstall the front bezel on drawer 3.
16. Reinstall the front bezel on drawer 4.

### CEC hot-node add and hot-node repair maintenance on a four drawer system with a two or four socket CPU card - Drawer 2 front

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 2. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 21 on page 58.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove the front bezel from drawer 3.
4. Remove SMP flex assembly 4.
5. Disconnect SMP flex assembly latch 6T from drawer 2.
6. Remove SMP flex assembly 2.
7. Bend the SMP flex assembly out of the way
8. Perform any necessary maintenance operations.
9. Reinstall SMP flex assembly 2 to connector P3-T4 on drawer 1 and to connector P3-T4 on drawer 2.
10. Reconnect SMP flex assembly latch 6T to connector P3-T3 on drawer 2.
11. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 2 and to connector P3-T2 on drawer 3.
12. Reinstall the front bezel on drawer 1.
13. Reinstall the front bezel on drawer 2.
14. Reinstall the front bezel on drawer 3.

### **CEC hot-node add and hot-node repair maintenance on a four drawer system with a two or four socket CPU card - Drawer 3 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 3. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 21 on page 58.

1. Remove the front bezel from drawer 2.
2. Remove the front bezel from drawer 3.
3. Remove the front bezel from drawer 4.
4. Remove SMP flex assembly 4.
5. Remove SMP flex assembly 7.
6. Disconnect SMP flex assembly latch 3B from drawer 3.
7. Bend the SMP flex assembly out of the way.
8. Perform any necessary maintenance operations.
9. Reconnect SMP flex assembly latch 3B to connector P3-T1 on drawer 3.
10. Reinstall SMP flex assembly 7 to connector P3-T3 on drawer 3 and to connector P3-T3 on drawer 4.
11. Reinstall SMP flex assembly 4 to connector P3-T2 on drawer 2 and to connector P3-T2 on drawer 3. Slip vertical portion of cable under SMP flex assembly 5, but over SMP flex assembly 3.
12. Reinstall the front bezel on drawer 2.
13. Reinstall the front bezel on drawer 3.
14. Reinstall the front bezel on drawer 4.

### **CEC hot-node add and hot-node repair maintenance on a four drawer system with a two or four socket CPU card - Drawer 4 front**

Perform CEC hot-node add and hot-node repair maintenance on the front CEC (central processing unit, memory, and other CEC components) or drawer replacement of drawer 4. This procedure is not necessary for hard disk drive, storage media, or assembly. For information about SMP flex assembly locations and codes, see Figure 21 on page 58.

1. Remove the front bezel from drawer 1.
2. Remove the front bezel from drawer 2.
3. Remove the front bezel from drawer 3.
4. Remove the front bezel from drawer 4.
5. Remove SMP flex assembly 5.

6. Remove SMP flex assembly 7.
7. Remove SMP flex assembly 6.
8. Perform any necessary maintenance operations.
9. Reinstall SMP flex assembly 6 to connector P3-T3 on drawer 2 and to connector P3-T4 on drawer 4.
10. Reinstall SMP flex assembly 7 to connector P3-T3 on drawer 3 and to connector P3-T3 on drawer 4.
11. Reinstall SMP flex assembly 5 to connector P3-T1 on drawer 1 and to connector P3-T1 on drawer 4.
12. Reinstall the front bezel on drawer 1.
13. Reinstall the front bezel on drawer 2.
14. Reinstall the front bezel on drawer 3.
15. Reinstall the front bezel on drawer 4.

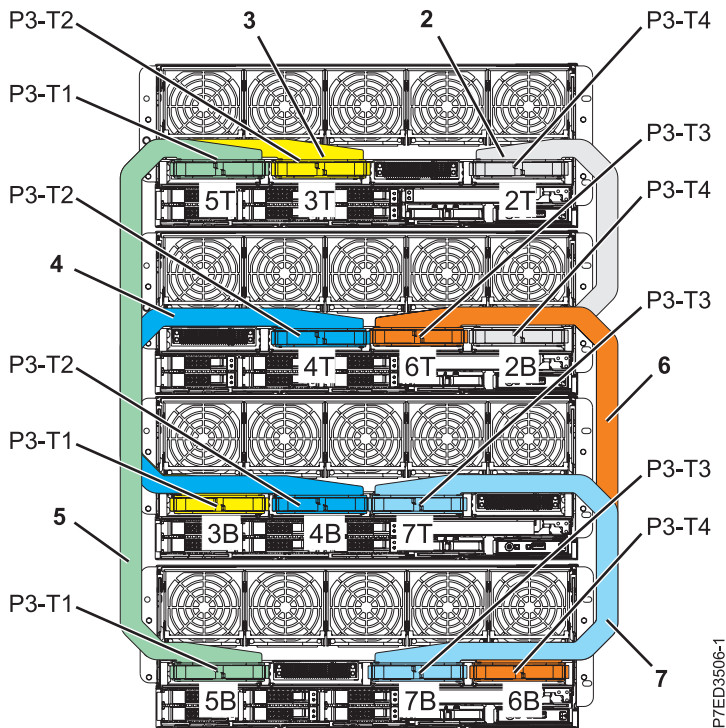


Figure 21. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD four-drawer flex cabling - front

### CEC hot-node add and hot-node repair maintenance on a four drawer system - Drawer 1 rear

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 1. For information about FSP flex assembly locations and codes, see Figure 22 on page 60.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 1.
2. Remove the FSP cover from drawer 2.
3. Disconnect FSP flex assembly C connector P1-C1-T1 from drawer 1.
4. Disconnect FSP flex assembly B connector P1-C1-T2 from drawer 1.
5. Disconnect FSP flex assembly A connectors P1-C1-T3 and P2-T1 from drawer 1.

6. Bend all the three FSP flex assemblies out of the way.
7. Perform any necessary maintenance operations.
8. Reconnect FSP flex assembly A connector P2-T1 to drawer 1.
9. Reconnect FSP flex assembly A connector P1-C1-T3 to drawer 1.
10. Reconnect FSP flex assembly B connector P1-C1-T2 to drawer 1.
11. Reconnect FSP flex assembly C connector P1-C1-T1 to drawer 1.
12. Reinstall the FSP cover on drawer 1.
13. Reinstall the FSP cover on drawer 2.

### **CEC hot-node add and hot-node repair maintenance on a four drawer system - Drawer 2 rear**

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 2. For information about FSP flex assembly locations and codes, see Figure 22 on page 60.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 1.
2. Remove the FSP cover from drawer 2.
3. Remove the FSP cover from drawer 3.
4. Disconnect FSP flex assembly C connector P1-C1-T1 from drawer 2.
5. Disconnect FSP flex assembly B connector P1-C1-T2 from drawer 2.
6. Disconnect FSP flex assembly A connectors P1-C1-T3 and P2-T1 from drawer 2.
7. Bend the four FSP flex assembly connectors out of the way.
8. Perform any necessary maintenance operations.
9. Reconnect FSP flex assembly A connector P2-T1 to drawer 2.
10. Reconnect FSP flex assembly A connector P1-C1-T3 to drawer 2.
11. Reconnect FSP flex assembly B connector P1-C1-T2 to drawer 2.
12. Reconnect FSP flex assembly C connector P1-C1-T1 to drawer 2.
13. Reinstall the FSP cover on drawer 1.
14. Reinstall the FSP cover on drawer 2.
15. Reinstall the FSP cover on drawer 3.

### **CEC hot-node add and hot-node repair maintenance on a four drawer system - Drawer 3 rear**

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 3. For information about FSP flex assembly locations and codes, see Figure 22 on page 60.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 2.
2. Remove the FSP cover from drawer 3.
3. Remove the FSP cover from drawer 4.
4. Disconnect FSP flex assembly B connectors P1-C1-T1 and P2-T1 from drawer 3.
5. Bend the FSP flex assembly out of the way.
6. Perform any necessary maintenance operations.
7. Reconnect FSP flex assembly B connector P2-T1 to drawer 3.
8. Reconnect FSP flex assembly B connector P1-C1-T1 to drawer 3.

9. Reinstall the FSP cover on drawer 2.
10. Reinstall the FSP cover on drawer 3.
11. Reinstall the FSP cover on drawer 4.

### CEC hot-node add and hot-node repair maintenance on a four drawer system - Drawer 4 rear

Perform CEC hot-node add and hot-node repair maintenance on the rear FSP or drawer replacement of drawer 4. For information about FSP flex assembly locations and codes, see Figure 22.

**Attention:** FSP cable connector plugging sequence is critical. The cable connector P2-T1 must be plugged before completing all other connections for a given enclosure. Failure to connect the P2-T1 connector first may cause system errors.

1. Remove the FSP cover from drawer 3.
2. Remove the FSP cover from drawer 4.
3. Disconnect FSP flex assembly C connectors P1-C1-T1 and P2-T1 from drawer 4.
4. Bend the FSP flex assembly out of the way.
5. Perform any necessary maintenance operations.
6. Reconnect FSP flex assembly C connector P2-T1 to drawer 4.
7. Reconnect FSP flex assembly C connector P1-C1-T1 to drawer 4.
8. Reinstall the FSP cover on drawer 3.
9. Reinstall the FSP cover on drawer 4.

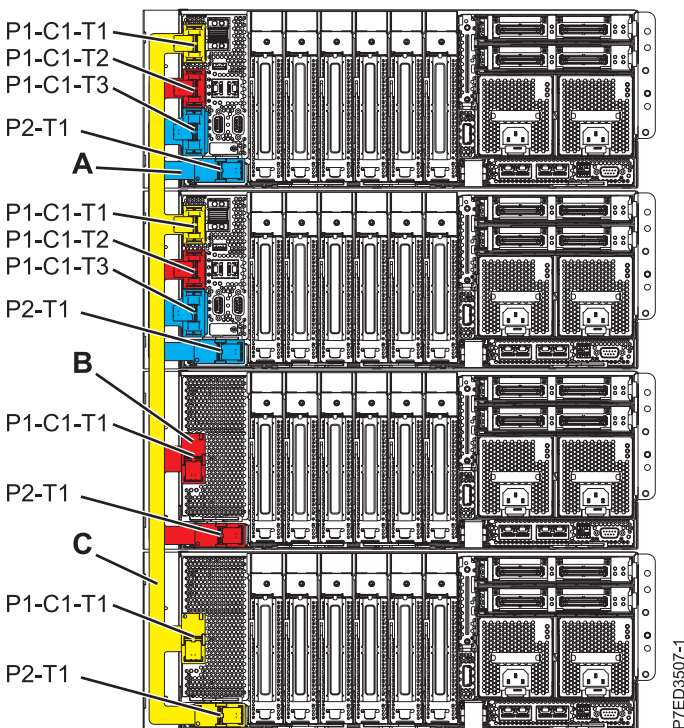


Figure 22. Model 9117-MMB, 9117-MMC, 9117-MMD, 9179-MHB, 9179-MHC, and 9179-MHD four-drawer flex cabling - rear



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When attaching a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices supplied with the monitor.

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The following Class A statements apply to the IBM servers that contain the POWER7<sup>®</sup> processor and its features unless designated as electromagnetic compatibility (EMC) Class B in the feature information.

## **Federal Communications Commission (FCC) statement**

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## **Industry Canada Compliance Statement**

This Class A digital apparatus complies with Canadian ICES-003.

## **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## **European Community Compliance Statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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IBM Deutschland GmbH  
Technical Regulations, Department M372  
IBM-Allee 1, 71139 Ehningen, Germany  
Tele: +49 7032 15 2941  
email: [lugi@de.ibm.com](mailto:lugi@de.ibm.com)

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VCCI-A

The following is a summary of the VCCI Japanese statement in the box above:

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### Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

高調波ガイドライン適合品

### Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline with Modifications (products greater than 20 A per phase)

高調波ガイドライン準用品

## Electromagnetic Interference (EMI) Statement - People's Republic of China

### 声 明

此为 A 级产品,在生活环境  
中,该产品可能会造成无线电干  
扰。在这种情况下,可能需要用  
户对其干扰采取切实可行的措  
施。

Declaration: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may need to perform practical action.

## Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者：  
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The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

### IBM Taiwan Contact Information:

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

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Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:  
International Business Machines Corp.  
New Orchard Road  
Armonk, New York 10504  
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:  
IBM Deutschland GmbH  
Technical Regulations, Abteilung M372  
IBM-Allee 1, 71139 Ehningen, Germany  
Tel: +49 7032 15 2941  
email: [lugi@de.ibm.com](mailto:lugi@de.ibm.com)

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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#### **Class B Notices**

The following Class B statements apply to features designated as electromagnetic compatibility (EMC) Class B in the feature installation information.

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM-authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM-authorized dealers. IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **Industry Canada Compliance Statement**

This Class B digital apparatus complies with Canadian ICES-003.

### **Avis de conformité à la réglementation d'Industrie Canada**

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Technical Regulations, Department M372  
IBM-Allee 1, 71139 Ehningen, Germany  
Tele: +49 7032 15 2941  
email: [lugi@de.ibm.com](mailto:lugi@de.ibm.com)

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高調波ガイドライン適合品

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高調波ガイドライン準用品

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台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
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International Business Machines Corp.  
New Orchard Road  
Armonk, New York 10504  
Tel: 914-499-1900

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IBM Deutschland GmbH  
Technical Regulations, Abteilung M372  
IBM-Allee 1, 71139 Ehningen, Germany  
Tel: +49 7032 15 2941  
email: lugi@de.ibm.com

Generelle Informationen:

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse B.**

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