Abstract
This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.
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Component identification

Front panel components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drive bays 6-10*</td>
</tr>
<tr>
<td>2</td>
<td>Systems Insight Display</td>
</tr>
<tr>
<td>3</td>
<td>Fans 1-4</td>
</tr>
<tr>
<td>4</td>
<td>Drive bays 1-5</td>
</tr>
<tr>
<td>5</td>
<td>Discovery services connectors</td>
</tr>
<tr>
<td>6</td>
<td>Video connector</td>
</tr>
<tr>
<td>7</td>
<td>USB connectors (2)</td>
</tr>
</tbody>
</table>

* Drives installed in these bays require the optional SAS backplane and cables.
## Front panel LEDs and buttons

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power on/Standby button and system power LED</td>
<td>Solid green = System on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing green (1 Hz/cycle per sec) = Performing power on sequence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid amber = System in standby</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off = No power present</td>
</tr>
<tr>
<td>2</td>
<td>Health LED</td>
<td>Solid green = Normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing amber = System degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red (1 Hz/cycle per sec) = System critical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast-flashing red (4 Hz/cycles per sec) = System power fault</td>
</tr>
<tr>
<td>3</td>
<td>Aggregate NIC LED</td>
<td>Solid green = Link to network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing green = Linked with activity on the network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off = No network connection</td>
</tr>
<tr>
<td>4</td>
<td>UID button/link</td>
<td>Solid blue = Activated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing blue (1 Hz/cycle per sec) = Remote management or firmware upgrade in progress</td>
</tr>
</tbody>
</table>
# Systems Insight Display

The Systems Insight Display LEDs represent the server and component layout.

![Image of Systems Insight Display](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power cap</td>
<td>Green = System on or requesting power on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing amber = Power on denied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off = Standby</td>
</tr>
<tr>
<td>2</td>
<td>Overtemperature</td>
<td>Off = Normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber = Failed or missing component</td>
</tr>
<tr>
<td>3</td>
<td>Amp status</td>
<td>Off = No protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green = Protection enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber = Memory failure occurred</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber (flashing) = Memory configuration error</td>
</tr>
<tr>
<td>4</td>
<td>NIC activity/link</td>
<td>Green = Linked to network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green (flashing) = Linked with activity on the network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off = No network connection</td>
</tr>
<tr>
<td></td>
<td>All other LEDs</td>
<td>Off = Normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber = Failed or missing component</td>
</tr>
</tbody>
</table>
Rear panel components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Expansion board slot 1</td>
</tr>
<tr>
<td>2</td>
<td>Expansion board slot 2</td>
</tr>
<tr>
<td>3</td>
<td>Expansion board slot 3</td>
</tr>
<tr>
<td>4</td>
<td>Expansion board slot 4</td>
</tr>
<tr>
<td>5</td>
<td>Expansion board slot 5</td>
</tr>
<tr>
<td>6</td>
<td>Expansion board slot 6</td>
</tr>
<tr>
<td>7</td>
<td>Expansion board slot 7</td>
</tr>
<tr>
<td>8</td>
<td>Expansion board slot 8</td>
</tr>
<tr>
<td>9</td>
<td>Expansion board slot 9</td>
</tr>
<tr>
<td>10</td>
<td>FlexibleLOM slot</td>
</tr>
<tr>
<td>11</td>
<td>SPI board</td>
</tr>
<tr>
<td>12</td>
<td>Power supply 1</td>
</tr>
<tr>
<td>13</td>
<td>Power supply 2</td>
</tr>
<tr>
<td>14</td>
<td>Power supply bay 3</td>
</tr>
<tr>
<td>15</td>
<td>Power supply bay 4</td>
</tr>
</tbody>
</table>
## Power supply LED

<table>
<thead>
<tr>
<th>Fail LED-amber (Located on the SID)</th>
<th>Power LED-green (Located on the power supply)</th>
<th>Front external health LED (Located on the front panel)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>No AC power to power supply units</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>Green</td>
<td>AC present/Standby outputs on Power supply DC outputs on and OK</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>Amber (flashing) – redundant Red (flashing) – non-redundant</td>
<td>Power supply failure (includes over voltage and over temperature)</td>
</tr>
</tbody>
</table>
I/O board components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NMI jumper</td>
</tr>
<tr>
<td>2</td>
<td>Slot 1 PCIe3 x16 (16, 8, 4, 2, 1)</td>
</tr>
<tr>
<td>3</td>
<td>Slot 2 PCIe3 x16 (16, 8, 4, 2, 1)</td>
</tr>
<tr>
<td>4</td>
<td>System maintenance switch</td>
</tr>
<tr>
<td>5</td>
<td>Slot 3 PCIe3 x16 (16, 8, 4, 2, 1)</td>
</tr>
<tr>
<td>6</td>
<td>Slot 4 PCIe3 x16 (8, 4, 2, 1)</td>
</tr>
<tr>
<td>7</td>
<td>Slot 5 PCIe3 x16 (8, 4, 2, 1)</td>
</tr>
<tr>
<td>8</td>
<td>Slot 6 PCIe3 x16 (16, 8, 4, 2, 1)</td>
</tr>
<tr>
<td>9</td>
<td>Slot 7 PCIe3 x16 (8, 4, 2, 1)</td>
</tr>
<tr>
<td>10</td>
<td>Slot 8 PCIe3 x16 (8, 4, 2, 1)</td>
</tr>
<tr>
<td>11</td>
<td>Slot 9 PCIe3 x16 (16, 8, 4, 2, 1)</td>
</tr>
<tr>
<td>12</td>
<td>SPI board connector</td>
</tr>
<tr>
<td>13</td>
<td>FlexibleLOM connector</td>
</tr>
</tbody>
</table>
System maintenance switch

The system maintenance switch (SW1) is a twelve-position switch that is used for system configuration. The default position for all twelve positions is Off.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Settings</th>
</tr>
</thead>
</table>
| 1      | Off = iLO security enabled  
         | On = iLO security disabled |
| 2      | Off = Normal operation  
         | On = The BIOS configuration is locked. |
| 5      | Off = Normal operation  
         | On = Password disabled |
| 6      | Off = Normal operation  
         | On = Clear CMOS and RAM |
| 7*     | Off = Set factory default boot mode to UEFI.  
         | On = Set factory default boot mode to Legacy. |
| 3, 4, 8, 9, 10, 11, 12 | Reserved |

* The default position for switch 7 is set in the factory shipping configuration. This switch setting determines the BIOS mode the system defaults to when configuration memory is cleared to factory defaults. The User defined defaults setting in UEFI System Utilities supersedes this switch.

**IMPORTANT:** To avoid a mismatch between boot modes, HP recommends setting system maintenance switch 7 to the same BIOS boot mode the server is deployed in. Otherwise, the storage controller may not recognize the OS installed on the storage media.

NMI jumper

The NMI jumper allows administrators to perform a memory dump before performing a hard reset. Crash dump analysis is an essential part of eliminating reliability problems, such as hangs or crashes in OSs, device drivers, and applications. Many crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that would support root cause analysis.

Systems running Microsoft® Windows® experience a blue-screen trap when the OS crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by temporarily shorting the NMI header with a jumper. The NMI event enables a hung system to become responsive again.
## SPI board components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top SAS backplane connector</td>
</tr>
<tr>
<td>2</td>
<td>SAS cache module connector</td>
</tr>
<tr>
<td>3</td>
<td>Systems Insight Display Power/UID connector</td>
</tr>
<tr>
<td>4</td>
<td>Internal USB connector</td>
</tr>
<tr>
<td>5</td>
<td>TPM connector</td>
</tr>
<tr>
<td>6</td>
<td>Front video/USB connector</td>
</tr>
<tr>
<td>7</td>
<td>Battery</td>
</tr>
<tr>
<td>8</td>
<td>Internal USB connector</td>
</tr>
<tr>
<td>9</td>
<td>Serial connector</td>
</tr>
<tr>
<td>10</td>
<td>Video connector</td>
</tr>
<tr>
<td>11</td>
<td>USB connectors (4)</td>
</tr>
<tr>
<td>12</td>
<td>iLO connector</td>
</tr>
<tr>
<td>13</td>
<td>FlexibleLOM port 1*</td>
</tr>
<tr>
<td>14</td>
<td>FlexibleLOM port 2*</td>
</tr>
<tr>
<td>15</td>
<td>FlexibleLOM port 3*</td>
</tr>
<tr>
<td>16</td>
<td>FlexibleLOM port 4*</td>
</tr>
</tbody>
</table>

*Port configuration is dependent on the installed FlexibleLOM and may differ from what is shown in the illustration.
## Power daughter board components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upper SAS backplane power connector</td>
</tr>
<tr>
<td>2</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>3</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>4</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>5</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>6</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>7</td>
<td>I/O board auxiliary power connector</td>
</tr>
<tr>
<td>8</td>
<td>Power backplane data connector</td>
</tr>
<tr>
<td>9</td>
<td>Power backplane data connector</td>
</tr>
<tr>
<td>10</td>
<td>I/O board power connector</td>
</tr>
</tbody>
</table>
**DIMM slot locations**

Each memory cartridge contains 12 DIMM slots. Install DIMMs in pairs in alphabetical order.

For installation guidelines, see "Memory options (on page 47)."
Processors and memory cartridges

The processor memory drawer contains 4 processor sockets and 8 memory cartridges.

For DIMM numbering, see "DIMM slot locations (on page 15)."

For installation guidelines, see "Memory options (on page 47)."
## DIMM fault LEDs

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power fault LED (board B)</td>
<td>Off = The DIMMs are operating normally. Solid amber = One or more DIMMs in the cartridge is experiencing a power fault condition.</td>
</tr>
<tr>
<td>2</td>
<td>General board fault LED (board B)</td>
<td>Off = The DIMMs are operating normally. Solid amber = One or more DIMMs in the cartridge is experiencing a general fault condition.</td>
</tr>
<tr>
<td>3</td>
<td>General board fault LED (board A)</td>
<td>Off = The DIMMs are operating normally. Solid amber = One or more DIMMs in the cartridge is experiencing a general fault condition.</td>
</tr>
<tr>
<td>4</td>
<td>Power fault LED (board A)</td>
<td>Off = The DIMMs are operating normally. Solid amber = One or more DIMMs in the cartridge is experiencing a power fault condition.</td>
</tr>
</tbody>
</table>

To determine which DIMMs are experiencing a fault condition, see "DIMM fault identification button (on page 18)."
DIMM fault identification button

When the DIMM fault LEDs (on page 17) indicate that a DIMM is experiencing an error, press the DIMM fault identification button to illuminate the LED below the affected DIMM ("Memory error LEDs" on page 19).

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Board B DIMM fault identification button</td>
</tr>
<tr>
<td>2</td>
<td>Board A DIMM fault identification button</td>
</tr>
</tbody>
</table>
Memory error LEDs

When the DIMM fault LEDs (on page 17) indicate that a DIMM is experiencing an error, the memory error LED below the affected DIMM illuminates red when the DIMM fault identification button (on page 18) is pressed.

Drive bay numbering

Drives installed in bays 6-10 require the optional SAS backplane.
## Hot-plug drive LED definitions

<table>
<thead>
<tr>
<th>Item</th>
<th>LED</th>
<th>Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Locate</td>
<td>Solid blue</td>
<td>The drive is being identified by a host application.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing blue</td>
<td>The drive carrier firmware is being updated or requires an update.</td>
</tr>
<tr>
<td>2</td>
<td>Activity ring</td>
<td>Rotating green</td>
<td>Drive activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No drive activity</td>
</tr>
<tr>
<td>3</td>
<td>Do not remove</td>
<td>Solid white</td>
<td>Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Removing the drive does not cause a logical drive to fail.</td>
</tr>
<tr>
<td>4</td>
<td>Drive status</td>
<td>Solid green</td>
<td>The drive is a member of one or more logical drives.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing green</td>
<td>The drive is rebuilding or performing a RAID migration, strip size migration, capacity expansion, or logical drive extension, or is erasing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing amber/green</td>
<td>The drive is a member of one or more logical drives and predicts the drive will fail.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing amber</td>
<td>The drive is not configured and predicts the drive will fail.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid amber</td>
<td>The drive has failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>The drive is not configured by a RAID controller.</td>
</tr>
</tbody>
</table>
FBWC capacitor slots

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slots 2-4—Connect to optional SAS controllers</td>
</tr>
<tr>
<td>2</td>
<td>Slot 1—Connects to the SPI board</td>
</tr>
</tbody>
</table>

FBWC module LEDs

The FBWC module has three single-color LEDs (one amber and two green). The LEDs are duplicated on the reverse side of the cache module to facilitate status viewing.

<table>
<thead>
<tr>
<th>1 - Amber</th>
<th>2 - Green</th>
<th>3 - Green</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>The cache module is not powered.</td>
</tr>
<tr>
<td>Off</td>
<td>Flashing once every 2 seconds</td>
<td>Flashing once every 2 seconds</td>
<td>The cache microcontroller is executing from within its boot loader and receiving new flash code from the host controller.</td>
</tr>
<tr>
<td>Off</td>
<td>Flashing once per second</td>
<td>Flashing once per second</td>
<td>The cache module is powering up, and the capacitor pack is charging.</td>
</tr>
<tr>
<td>1 - Amber</td>
<td>2 - Green</td>
<td>3 - Green</td>
<td>Interpretation</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>Flashing once per second</td>
<td>The cache module is idle, and the capacitor pack is charging.</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>On</td>
<td>The cache module is idle, and the capacitor pack is charged.</td>
</tr>
<tr>
<td>Off</td>
<td>On</td>
<td>On</td>
<td>The cache module is idle, the capacitor pack is charged, and the cache contains data that has not yet been written to the drives.</td>
</tr>
<tr>
<td>Off</td>
<td>Flashing once per second</td>
<td>Off</td>
<td>A backup of the DDR content on the cache module is in progress.</td>
</tr>
<tr>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>The current backup is complete with no errors.</td>
</tr>
<tr>
<td>Flashing once per second</td>
<td>Flashing once per second</td>
<td>Off</td>
<td>The current backup failed, and data has been lost.</td>
</tr>
<tr>
<td>Flashing once per second</td>
<td>Flashing once per second</td>
<td>On</td>
<td>A power error occurred during the previous or current boot. Data may be corrupt.</td>
</tr>
<tr>
<td>Flashing once per second</td>
<td>On</td>
<td>Off</td>
<td>An overtemperature condition exists.</td>
</tr>
<tr>
<td>Flashing twice per second</td>
<td>Flashing twice per second</td>
<td>Off</td>
<td>The capacitor pack is not attached.</td>
</tr>
<tr>
<td>Flashing twice per second</td>
<td>Flashing twice per second</td>
<td>On</td>
<td>The capacitor has been charging for 10 minutes, but has not reached sufficient charge to perform a full backup.</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>Off</td>
<td>The current backup is complete, but power fluctuations occurred during the backup.</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>On</td>
<td>The cache module microcontroller has failed.</td>
</tr>
</tbody>
</table>

**Fan locations**

![Fan diagram]
Operations

Power up the server

To power up the server, press the Power On/Standby button.

Power down the server

⚠️ **WARNING:** To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

💡 **IMPORTANT:** If installing a hot-plug device, it is not necessary to power down the server.

1. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.
   
   **NOTE:** If the operating system automatically places the server in Standby mode, omit the next step.
3. Press the Power On/Standby button to place the server in Standby mode. When the server activates Standby power mode, the system power LED changes to amber.
   
   💡 **IMPORTANT:** Pressing the UID button illuminates the blue UID LEDs on the front and rear panels. In a rack environment, this feature facilitates locating a server when moving between the front and rear of the rack.
4. Disconnect the power cords.

The system is now without power.

Extend the server from the rack

⚠️ **WARNING:** To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

⚠️ **WARNING:** To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

To extend the server from the rack:

1. Pull down the quick-release levers on each side of the server to release the server from the rack. If necessary, loosen the rack screws.
2. Extend the server on the rack rails until the server rail-release latches engage.

3. After performing the installation or maintenance procedure, slide the server into the rack by pressing the server rail-release latches.

---

Remove the server from the rack

⚠️ **WARNING:** To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

⚠️ **WARNING:** To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.
To remove the server from the rack:

1. Pull down the quick-release levers on each side of the server to release the server from the rack. If necessary, loosen the rack screws.

2. Extend the server on the rack rails until the server rail-release latches engage.

3. Remove the server from the rack.

After performing the installation or maintenance procedure, do the following:

1. Mount the server on the rails:
- Top loading telescoping rails

- Front loading telescoping rails
2. Slide the server into the rack by pressing the server rail-release latches.

Remove the access panel

⚠️ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

⚠️ **CAUTION:** Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

To remove the component:

1. Power down the server (on page 23).
2. Extend the server from the rack (on page 23).
3. Open the locking latch, slide the access panel to the rear of the chassis, and remove the access panel. If the locking latch is locked, use a T-15 Torx screwdriver to unlock the latch.
Processor memory drawer shipping screw locations

Two orange shipping screws secure the processor memory drawer in place during shipping. You must remove the screws to access the processor memory drawer. Retain the screws for future use.

Remove the processor memory drawer

⚠️ **WARNING:** The processor memory drawer weighs more than 11.3 kg (25.0 lb). Use extra caution when removing and replacing the processor memory drawer.

1. Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).
2. Push the button on the release lever.
3. Lower the handle, and then extend the processor memory drawer from the server until the release latches catch.
4. Firmly holding the processor memory drawer, press the release buttons and then remove the drawer from the server.

Remove the processor memory drawer cover

1. Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).
2. Remove the processor memory drawer (on page 28).
3. Remove the processor memory drawer cover.

Access the Systems Insight Display

To access the Systems Insight Display:
1. Press and release the panel.
2. After the display fully ejects, rotate the display to the left to view the LEDs.

Remove the SPI board

To remove the component:
1. Power down the server (on page 23).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Extend the server from the rack (on page 23).
4. Remove the access panel (on page 27).
5. Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).
6. Extend the processor memory drawer approximately 2.54-5.1 cm (1-2 inches).

7. Loosen the thumbscrews on the SPI board, and then lift the SPI board to access the cables.

8. Disconnect all cables from the SPI board.  
   **IMPORTANT:** If replacing the SPI board or clearing NVRAM, you must re-enter the server serial number through the Advanced System ROM options in UEFI System Utilities ("Re-entering the server serial number and product ID" on page 80).

9. Remove the SPI board from the server.
Optional installation services

Delivered by experienced, certified engineers, HP Care Pack services help you keep your servers up and running with support packages tailored specifically for HP ProLiant systems. HP Care Packs let you integrate both hardware and software support into a single package. A number of service level options are available to meet your needs.

HP Care Pack Services offer upgraded service levels to expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Some of the Care Pack services are:

- Hardware support
  - 6-Hour Call-To-Repair
  - 4-Hour 24x7 Same Day
  - 4-Hour Same Business Day
- Software support
  - Microsoft operating systems
  - Linux operating systems
  - HP Insight Control
  - VMware
- Integrated hardware and software support
  - Critical Service
  - Proactive 24
  - Support Plus
  - Support Plus 24
- Startup and implementation services for both hardware and software

For more information on HP Care Pack Services, see the HP website (http://www.hp.com/services/carepack).

Rack planning resources

The rack resource kit ships with all HP Intelligent Series racks. For more information on the content of each resource, see the rack resource kit documentation.

Optimum environment

When installing the server in a rack, select a location that meets the environmental standards described in this section.
Space and airflow requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

HP servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

⚠️ **CAUTION:** To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

⚠️ **CAUTION:** Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

The 9000 and 10000 Series Racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.

⚠️ **CAUTION:** When using a Compaq branded 7000 series rack, install the high airflow rack door insert (PN 327281-B21 for 42U rack, PN 157847-B21 for 22U rack) to provide proper front-to-back airflow and cooling.

⚠️ **CAUTION:** If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:
- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

⚠️ **IMPORTANT:** The HP ProLiant DL580 Gen8 Server cable management arm is not supported on Compaq branded 7000 series racks.

Temperature requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).
CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
- Do not exceed the manufacturer’s TMRA.

Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80% of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

Electrical grounding requirements

The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, HP recommends the use of a PDU that is either permanently wired to the building’s branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

Rack warnings
**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

**WARNING:** To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and might become unstable when being moved on its casters.
- Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.

### Identifying the contents of the server shipping carton

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server. All the rack mounting hardware necessary for installing the server into the rack is included with the rack or the server.

The contents of the server shipping carton include:

- Server
- Power cord
- Hardware documentation, Documentation CD, and software products
- Rack-mounting hardware

In addition to the supplied items, you might need:

- Operating system or application software
- Hardware options

### Installing hardware options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to "Hardware options installation (on page 39)."

### Installing the server into the rack

**CAUTION:** Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.

1. Install the server and cable management arm into the rack. For more information, see the installation instructions that ship with the Quick Deploy Rail System.
2. Connect peripheral devices to the server. For information on identifying connectors, see "SPI board components (on page 13)."
WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

3. Connect the power cord to the rear of the server.
4. Install the power cord anchors.

5. Secure the cables to the cable management arm.

IMPORTANT: When using cable management arm components, be sure to leave enough slack in each of the cables to prevent damage to the cables when the server is extended from the rack.
6. Connect the power cord to the AC power source.

⚠️ **WARNING:** To reduce the risk of electric shock or damage to the equipment:
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

---

### Installing the operating system

This ProLiant server ships with Intelligent Provisioning installed. Everything needed to manage and install the system software and firmware is preloaded on the server.

To operate properly, the server must have a supported operating system. For the latest information on operating system support, see the HP website (http://www.hp.com/go/supportos).

To install an operating system on the server, use one of the following methods:
• Intelligent Provisioning—iLO Management is a feature on ProLiant servers that contains Intelligent Provisioning for embedded server configuration, OS deployment, and provisioning capabilities. Intelligent Provisioning can configure the server and install an operating system, eliminates the need for SmartStart CDs and Smart Update Firmware DVDs used in past generations of HP ProLiant servers.

To install an operating system on the server with Intelligent Provisioning (local or remote):

a. Connect the Ethernet cable, and then power on the server.

b. During server POST, press the F10 key.

c. Complete the initial Preferences and Registration portion of Intelligent Provisioning (on page 74).

d. At the 1 Start screen, click the Configure and Install button.

e. To finish the installation, follow the onscreen prompts. An Internet connection is required to update the firmware and systems software.

• Remote deployment installation—To remotely deploy an operating system, use HP Insight Control server provisioning (on page 76) for an automated solution.

For additional system software and firmware updates, download the HP Service Pack for ProLiant from the HP website (http://www.hp.com/go/spp/download). Software and firmware must be updated before using the server for the first time, unless any installed software or components require an older version. For more information, see "Keeping the system current (on page 82)."

Powering on and selecting a boot option

1. Connect the Ethernet cable.

2. Press the Power On/Standby button.

3. During the initial boot:
   o To modify the server configuration ROM default settings, press F9 in the HP ProLiant POST screen to enter the UEFI System Utilities screen. By default, the System Utilities menus are in the English language.
   o If you do not need to modify the server configuration and are ready to install the system software, press F10 to access Intelligent Provisioning.

For more information on automatic configuration, see the HP UEFI System Utilities User Guide in the UEFI Information Library (http://www.hp.com/go/uefi/docs).

Registering the server

To experience quicker service and more efficient support, register the product at the HP Product Registration website (http://register.hp.com).
Hardware options installation

Introduction

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

⚠️ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

⚠️ **CAUTION:** To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Review "Electrostatic Discharge (on page 90)" before installing hardware options into the server.

Processor options

The server supports up to four processors. Observe the following processor installation guidelines:

- Processor socket 1 must be populated at all times so that the server functions properly.
- When installing PCIe boards, observe the PCIe board and processor population rules shown in the following table.

<table>
<thead>
<tr>
<th>PCIe slot</th>
<th>Description</th>
<th>Processor</th>
<th>Memory cartridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - FL/FH</td>
<td>PCIe3* x16 (16,8,4,2,1)</td>
<td>Processor 4</td>
<td>Memory cartridges 7 and 8</td>
</tr>
<tr>
<td>2 - FL/FH</td>
<td>PCIe3* x16 (16,8,4,2,1)</td>
<td>Processor 4</td>
<td>Memory cartridges 7 and 8</td>
</tr>
<tr>
<td>3 - FL/FH</td>
<td>PCIe3* x16 (16,8,4,2,1)</td>
<td>Processor 3</td>
<td>Memory cartridges 5 and 6</td>
</tr>
<tr>
<td>4 - FL/FH</td>
<td>PCIe3 x16 (8,4,2,1)</td>
<td>Processor 3</td>
<td>Memory cartridges 5 and 6</td>
</tr>
<tr>
<td>5 - FL/FH</td>
<td>PCIe3 x16 (8,4,2,1)</td>
<td>Processor 3</td>
<td>Memory cartridges 5 and 6</td>
</tr>
<tr>
<td>6 - FL/FH</td>
<td>PCIe3 x16 (8,4,2,1)</td>
<td>Processor 2</td>
<td>Memory cartridges 3 and 4</td>
</tr>
<tr>
<td>7 - FL/FH</td>
<td>PCIe3 x16 (8,4,2,1)</td>
<td>Processor 2</td>
<td>Memory cartridges 3 and 4</td>
</tr>
<tr>
<td>8 - FL/FH</td>
<td>PCIe3 x16 (8,4,2,1)</td>
<td>Processor 2</td>
<td>Memory cartridges 3 and 4</td>
</tr>
<tr>
<td>9 - FL/FH</td>
<td>PCIe3* x16 (16,8,4,2,1)</td>
<td>Processor 1</td>
<td>Memory cartridges 1 and 2</td>
</tr>
</tbody>
</table>

FL/FH = full-length, full-height PCIe board
HL/FH = half-length, full-height PCIe board
All PCIe connectors are capable of supplying up to 75W.
*High power double-width PCI cards (up to 300W) are supported in these slots with auxiliary power cables.
Installing the processor

The processors and memory are located in the drawer accessible from the front of the server. It is not necessary to extend or remove the server from the rack to install or replace processors and memory.

⚠️ **WARNING:** Use caution when installing or removing the processor memory drawer. The processor memory drawer is very heavy when fully populated.

⚠️ **CAUTION:** To prevent possible server malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

❗️ **IMPORTANT:** If installing a processor with a faster speed, update the system ROM before installing the processor.

❗️ **IMPORTANT:** Update the system BIOS prior to installing processor generation upgrades.

To install the component:

1. **Update the system ROM.**
   Locate and download the latest ROM version from the HP website (http://www.hp.com/support). Follow the instructions on the website to update the system ROM.

2. **Power down the server (on page 23).**

3. **Remove all power:**
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.

4. **Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).**

5. **Remove the processor memory drawer (on page 28).**

6. **Remove the processor memory drawer cover (on page 29).**

⚠️ **CAUTION:** The pins on the processor socket are very fragile. Any damage to them may require replacing the system board.
7. Open each of the processor locking levers in the order indicated, and then open the processor retaining bracket.

8. Remove the clear processor socket cover. Retain the processor socket cover for future use.
9. Install the processor. Verify that the processor is fully seated in the processor retaining bracket by visually inspecting the processor installation guides on either side of the processor. **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.**

![Image of processor installation]

⚠️ **CAUTION:** **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the system board, do not touch the processor or the processor socket contacts.

10. Close the processor retaining bracket. When the processor is installed properly inside the processor retaining bracket, the processor retaining bracket clears the flange on the front of the socket.

⚠️ **CAUTION:** Do not press down on the processor. Pressing down on the processor may cause damage to the processor socket and the system board. Press only in the area indicated on the processor retaining bracket.

11. Press and hold the processor retaining bracket in place, and then close each processor locking lever. Press only in the area indicated on the processor retaining bracket.
12. Remove the thermal interface protective cover from the heatsink.

\[\text{Diagram of heatsink removal}\]

\textbf{CAUTION:} To prevent the heatsink from tilting to one side during installation and removal procedures, use a diagonally opposite pattern (an “X” pattern) when loosening and tightening the two spring-loaded screws. To prevent the screws from breaking off, do not over-tighten the screws. A maximum torque of 0.45 N m (4 in-lb) is set for the system.

13. Install the heatsink.

\[\text{Diagram of heatsink installation}\]

14. Install the processor memory drawer cover.

15. Install the processor memory drawer.

16. Connect each power cord to the server.

17. Connect each power cord to the power source.
18. Power up the server (on page 23).

Memory cartridge option

Memory cartridge population guidelines

When installing memory cartridges, observe the following guidelines:

- Memory cartridges installed without a corresponding processor are not utilized:
  - Processor 1 corresponds to memory cartridges 1 and 2.
  - Processor 2 corresponds to memory cartridges 3 and 4.
  - Processor 3 corresponds to memory cartridges 5 and 6.
  - Memory cartridges 5 and 6 are not recognized if processor 3 is not installed.
  - Processor 4 corresponds to memory cartridges 7 and 8.
- To maximize performance, install two memory cartridges per processor and balance the total memory capacity between all installed processors.
- UDIMMs are not supported.
- Install DIMMs in pairs and in alphabetical order: A & B, C & D, E & F ...
- Do not mix LRDIMMs with any other DIM type (RDIMM, LVDIMM).
- RDIMM population is limited to a maximum of eight logical ranks per channel. Therefore, only two quad rank RDIMMs are supported per channel. If there are more than eight physical ranks per channel, LRDIMMs rank multiplication provides support for three DIMMs per channel.
- 1:1 Lockstep mode requires specific population requirements. For more information, see "Memory configurations (on page 49)."

Installing a memory cartridge

⚠️ **WARNING:** Use caution when installing or removing the processor memory drawer. The processor memory drawer is very heavy when fully populated.

To install the component:
1. Power down the server (on page 23).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).
4. Remove the processor memory drawer (on page 28).
5. Remove the processor memory drawer cover (on page 29).
6. Press the release button, and then lift the handles on the new memory cartridge.

7. Raise the lift tab on the new memory cartridge, and then open the cartridge.

8. Open the DIMM slot latches.
9. Install the DIMM.

⚠️ **CAUTION:** When closing the memory cartridge cover, be sure the plastic fingers under the cover do not catch on the top edge of the DIMMs.

10. Close the new memory cartridge.

11. While holding the baffle door open, install the new memory cartridge.

12. Install the processor memory drawer cover.

13. Install the processor memory drawer.

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. Power up the server (on page 23).
Memory options

**IMPORTANT:** This server does not support mixing LRDIMMs, RDIMMs, or UDIMMs. Attempting to mix any combination of these DIMMs can cause the server to halt during BIOS initialization.

The memory subsystem in this server supports LRDIMMs and RDIMMs:

- UDIMMs are not supported in this server.
- LRDIMMs support higher densities than single- and dual-rank RDIMMs, and higher speeds than quad-rank RDIMMs. This support enables you to install more high capacity DIMMs, resulting in higher system capacities and higher bandwidth.

All types are referred to as DIMMs when the information applies to all types. When specified as LRDIMM or RDIMM, the information applies to that type only. All memory installed in the server must be the same type.

The server supports the following DIMM speeds:

- Single and dual rank PC3L-12800R-11 (DDR3-1600) RDIMMs operating at up to 1333 MT/s at 1.35v
- Single and dual rank PC3-14900R-13 (DDR3-1866) RDIMMs operating at up to 1333 MT/s at 1.5v
- Quad rank PC3-14900L-13 (DDR3-1866) RDIMMs operating at up to 1600 MT/s at 1.5v

### Speed, voltage, and capacity

<table>
<thead>
<tr>
<th>DIMM type</th>
<th>DIMM rank</th>
<th>DIMM capacity</th>
<th>Maximum speed (MT/s)</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDIMM</td>
<td>Single-rank</td>
<td>4 GB</td>
<td>1333</td>
<td>LV</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single-rank</td>
<td>4 GB</td>
<td>1333</td>
<td>STD</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank</td>
<td>8 GB</td>
<td>1333</td>
<td>LV</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single-rank</td>
<td>8 GB</td>
<td>1333</td>
<td>STD</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank</td>
<td>16 GB</td>
<td>1333</td>
<td>STD</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank</td>
<td>16 GB</td>
<td>1333</td>
<td>LV</td>
</tr>
<tr>
<td>LRDIMM</td>
<td>Quad-rank</td>
<td>32 GB</td>
<td>1600</td>
<td>STD</td>
</tr>
</tbody>
</table>

Depending on the number of DIMMs installed, whether LRDIMMs or RDIMMs are installed, and whether the DIMM is operating and standard or low voltage, the memory clock speed can be reduced to 1333 or 1066 MT/s.

### Populated DIMM speed (MT/s)

<table>
<thead>
<tr>
<th>DIMM type</th>
<th>DIMM rank</th>
<th>1 DIMM per channel</th>
<th>2 DIMMs per channel</th>
<th>3 DIMMs per channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDIMM</td>
<td>Single-rank (4 GB)*</td>
<td>1333</td>
<td>1333</td>
<td>—</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single-rank (4 GB)**</td>
<td>1333</td>
<td>1333</td>
<td>1066</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single-rank (8 GB)*</td>
<td>1333</td>
<td>1066</td>
<td>—</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single rank (8 GB)**</td>
<td>1333</td>
<td>1333</td>
<td>1066</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank (16 GB)*</td>
<td>1333</td>
<td>1066</td>
<td>—</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank (16 GB)**</td>
<td>1333</td>
<td>1333</td>
<td>1066</td>
</tr>
</tbody>
</table>
DIMM type | DIMM rank | 1 DIMM per channel | 2 DIMMs per channel | 3 DIMMs per channel |
---|---|---|---|---|
LRDIMM | Quad-rank (32 GB)** | 1600 | 1600 | 1333 |

* Low voltage
** Standard voltage

Memory subsystem architecture

The memory subsystem in this server is divided into channels. Each processor supports eight channels, and each channel supports three DIMM slots, as shown in the following table.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Population order</th>
<th>Slot number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A E J</td>
<td>4 5 6</td>
</tr>
<tr>
<td>2</td>
<td>B F K</td>
<td>9 8 7</td>
</tr>
<tr>
<td>3</td>
<td>C G L</td>
<td>1 2 3</td>
</tr>
<tr>
<td>4</td>
<td>D H M</td>
<td>12 11 10</td>
</tr>
</tbody>
</table>

For the location of the slot numbers, see "DIMM slot locations (on page 15)."

This multi-channel architecture provides enhanced performance in Advanced ECC mode. This architecture also enables Lockstep and Online Spare Memory modes.

DIMM slots in this server are identified by number and by letter. Letters identify the population order. Slot numbers indicate the DIMM slot ID for spare replacement.

Single-, dual-, and quad-rank DIMMs

To understand and configure memory protection modes properly, an understanding of single-, dual-, and quad-rank DIMMs is helpful. Some DIMM configuration requirements are based on these classifications.

A single-rank DIMM has one set of memory chips that is accessed while writing to or reading from the memory. A dual-rank DIMM is similar to having two single-rank DIMMs on the same module. A quad-rank DIMM is, effectively, two dual-rank DIMMs on the same module. The server memory control subsystem selects the proper rank within the DIMM when writing to or reading from the DIMM.

Dual- and quad-rank DIMMs provide the greatest capacity with the existing memory technology. For example, if current DRAM technology supports 8-GB single-rank DIMMs, a dual-rank DIMM would be 16 GB, and a quad-rank DIMM would be 32 GB.

LRDIMMs are labeled as quad-rank DIMMs. There are four ranks of DRAM on the DIMM, but the LRDIMM buffer creates an abstraction that allows the DIMM to appear as a logical dual-rank DIMM to the system. This is called Rank-Multiplication. The LRDIMM buffer also isolates the electrical loading of the DRAM from the system to allow for faster operation. These two changes allow the system to support up to three LRDIMMs per memory channel, providing for up to 50% greater memory capacity and higher memory operating speed compared to quad-rank RDIMMs.
DIMM identification

To determine DIMM characteristics, use the label attached to the DIMM and the following illustration and table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Size</td>
<td>—</td>
</tr>
</tbody>
</table>
| 2    | Rank        | 1R = Single-rank  
           2R = Dual-rank   
           3R = Three-rank  
           4R = Quad-rank   |
| 3    | Data width  | x4 = 4-bit   
           x8 = 8-bit     |
| 4    | Voltage rating | L = Low voltage (1.35V)  
           U = Ultra low voltage (1.25V)  
           Blank or omitted = Standard |
| 5    | Memory speed | 12800 = 1600-MT/s  
           10600 = 1333-MT/s  
           14900 = 1866-MT/s |
| 6    | DIMM type   | R = RDIMM (registered)  
           E = UDIMM (unbuffered with ECC)  
           L = LRDIMM (load reduced) |

For the latest supported memory information, see the QuickSpecs on the HP website (http://h18000.www1.hp.com/products/quickspecs/ProductBulletin.html). At the website, choose the geographic region, and then locate the product by name or product category.

Memory configurations

To enhance server availability, the server supports Advanced ECC AMP modes. This mode provides up to 4-bit error correction and enhanced performance over Lockstep mode. This mode is the default option for this server.
Advanced Memory Protection options are configured in RBSU. If the requested AMP mode is not supported by the installed DIMM configuration, the server boots in Advanced ECC mode. For more information, see "HP ROM-Based Setup Utility."

The server can operate in independent channel mode (performance) or combined channel mode (lockstep). Lockstep mode improves the system reliability and availability. If running with RDIMM (built with x4 DRAM devices), the system can survive the complete failure of two DRAM devices (DDDC). Running in independent mode, the server can only survive the complete failure of a single DRAM device (SDDC).

### Maximum capacity

<table>
<thead>
<tr>
<th>DIMM type</th>
<th>DIMM rank</th>
<th>One processor</th>
<th>Two processors</th>
<th>Four processors</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDIMM</td>
<td>Single-rank (4GB)</td>
<td>96 GB</td>
<td>192 GB</td>
<td>384 GB</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Single-rank (8 GB)</td>
<td>192 GB</td>
<td>384 GB</td>
<td>768 GB</td>
</tr>
<tr>
<td>RDIMM</td>
<td>Dual-rank (16 GB)</td>
<td>384 GB</td>
<td>768 GB</td>
<td>1.5 TB</td>
</tr>
<tr>
<td>LRDIMM</td>
<td>Quad-rank (32 GB)</td>
<td>768 GB</td>
<td>1.5 TB</td>
<td>3 TB</td>
</tr>
</tbody>
</table>

For the latest memory configuration information, see the QuickSpecs on the HP website (http://www.hp.com/go/productbulletin).

### Advanced ECC memory configuration

Advanced ECC memory is the default memory protection mode for this server. Standard ECC can detect and correct single-bit memory errors and only detect multi-bit memory errors. When multi-bit errors are detected using Standard ECC, the error is signaled to the server to halt the server.

Advanced ECC protects the server against some multi-bit memory errors. Advanced ECC can detect and correct up to 4-bit memory errors if all failed bits are on the same DRAM device on the DIMM.

Advanced ECC provides additional protection over Standard ECC because it is possible to correct certain memory errors that would otherwise be uncorrected and result in a server failure. Using HP Advanced Memory Error Detection technology, the server provides notification when a DIMM is degrading and has a higher probability of uncorrectable memory error.

### Online Spare memory configuration

Online spare memory provides protection against degraded DIMMs by reducing the likelihood of uncorrected memory errors. This protection is available without any operating system support.

Online spare memory protection dedicates one rank of each memory channel for use as spare memory. The remaining ranks are available for OS and application use. If correctable memory errors occur at a rate higher than a specific threshold on any of the non-spare ranks, the server automatically copies the memory contents of the degraded rank to the online spare rank. The server then deactivates the failing rank and automatically switches over to the online spare rank.

### General DIMM slot population guidelines

Observe the following guidelines for all AMP modes:

- Install DIMMs only if the corresponding processor is installed.
- When multiple processors are installed, HP recommends balancing the DIMMs across the all processors.
- White DIMM slots denote the first slot of a channel (Ch 4A, Ch 9B, Ch 1C, Ch 12D...).
• Do not mix LRDIMMs and RDIMMs.
• UDIMMs are not supported on this server.
• When multiple processors are installed, HP recommends installing the DIMMs in sequential alphabetical order: 4A, 9B, 1C, 12D, and so on.

For detailed memory configuration rules and guidelines, use the Online DDR3 Memory Configuration Tool on the HP website (http://www.hp.com/go/ddr3memory-configurator).

DIMM speeds are supported as indicated in the following table.

<table>
<thead>
<tr>
<th>Populated slots (per channel)</th>
<th>Rank</th>
<th>Speeds supported (MT/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single- or dual-rank</td>
<td>1333</td>
</tr>
<tr>
<td>1</td>
<td>Quad-rank</td>
<td>1600</td>
</tr>
<tr>
<td>2</td>
<td>Single- or dual-rank</td>
<td>1066, 1333</td>
</tr>
<tr>
<td>2</td>
<td>Quad-rank</td>
<td>1600</td>
</tr>
<tr>
<td>3</td>
<td>Single- or dual-rank</td>
<td>1066</td>
</tr>
<tr>
<td>3</td>
<td>Quad-rank</td>
<td>1333</td>
</tr>
</tbody>
</table>

**Advanced ECC population guidelines**

For Advanced ECC mode configurations, observe the following guidelines:
• Observe the general DIMM slot population guidelines.
• DIMMs may be installed individually. HP recommends installing DIMMs in pairs.

**Online spare population**

For Online Spare memory mode configurations, observe the following guidelines:
• Observe the general DIMM slot population guidelines.
• Each channel must have a valid online spare configuration.
• Each channel can have a different valid online spare configuration.
• Each populated channel must have a spare rank:
  o A single dual-rank DIMM is not a valid configuration.
  o LRDIMMs are treated as dual-rank DIMMs.

**Installing a DIMM**

⚠️ **WARNING:** Use caution when installing or removing the processor memory drawer. The processor memory drawer is very heavy when fully populated.

To install the component:
1. Power down the server (on page 23).
2. Remove all power:
   a. Disconnect each power cord from the power source.
b. Disconnect each power cord from the server.

3. Remove the processor memory drawer shipping screws, if installed. Retain the screws for future use ("Processor memory drawer shipping screw locations" on page 28).

4. Remove the processor memory drawer (on page 28).

5. Remove the processor memory drawer cover (on page 29).

6. Press the release button, and then lift the handles on the new memory cartridge.

7. Raise the lift tab on the new memory cartridge, and then open the cartridge.

8. Open the DIMM slot latches.
9. Install the DIMM.

![Image of DIMM installation](image)

**CAUTION:** When closing the memory cartridge cover, be sure the plastic fingers under the cover do not catch on the top edge of the DIMMs.

10. Close the new memory cartridge.

11. While holding the baffle door open, install the new memory cartridge.

12. Install the processor memory drawer cover.

13. Install the processor memory drawer.

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. Power up the server (on page 23).
SAS drive backplane option

CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any system installation. Improper grounding can cause electrostatic discharge.

To install the component:
1. Power down the server (on page 23).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Remove the access panel (on page 27).
4. Extend the processor memory drawer approximately 2.54-5.1 cm (1-2 inches).

   ![Diagram of SAS drive backplane option]

5. Remove the SPI board (on page 30).
6. Install the backplane, and then tighten the thumbscrews.

7. Connect the data cable.
8. Connect the power cable.

9. Install the SPI board.

10. Install the processor memory drawer.

11. Install the access panel.

12. Remove all bezel blanks.
13. Install the drives.


15. Connect each power cord to the server.
16. Connect each power cord to the power source.

**SAS controller cable option**

The SAS controller cable option is required to enable a PCIe slot-based controller to drive the internal top bay drives. Otherwise, the drive indicator signaling will not correctly match the accessed drive. The bottom bay SAS drives cannot be controlled by a PCIe slot-based controller.

⚠️ **CAUTION:** To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any system installation. Improper grounding can cause electrostatic discharge.

To install the component:
1. Power down the server (on page 23).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Remove the access panel (on page 27).
4. Install the backplane, and then tighten the thumbscrews.

5. Connect the optional SAS controller cable.
6. Connect the power cable.

7. Install the access panel.

8. Remove all bezel blanks.

9. Install the drives.
10. Install blanks in unused drive bays.

11. Connect each power cord to the server.
12. Connect each power cord to the power source.

Drive option

When adding hard drives to the server, observe the following general guidelines:

- The system automatically sets all device numbers.
- If only one hard drive is used, install it in the bay with the lowest device number.
- Hard drives must be SFF types.

Drives should be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

For drive numbers, see "Drive bay numbering (on page 19)."

To install the component:

1. Remove the drive blank.
2. Install the drive.

3. Determine the status of the drive from the hot-plug SAS drive LED combinations ("Hot-plug drive LED definitions" on page 20).

4U rack bezel option

Removing the 4U rack bezel
Installing the 4U rack bezel

Redundant hot-plug power supply option

The server supports up to four hot-plug power supplies. Install all power supplies to provide full redundancy. HP recommends installing redundant hot-plug power supplies in pairs.

To confirm the redundancy of your configuration, see the HP power advisor at the HP website (http://www.hp.com/go/hppoweradvisor).

⚠️ WARNING: To reduce the risk of electric shock or damage to the equipment:
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.
1. Remove the power supply blank.

2. Slide the power supply into the power supply bay until the device locks into place.

3. Connect the power cord to the power supply.
4. Connect the power cord to the power source.
5. Be sure that the power supply LED is green.
6. Be sure that the front panel external health LED is green ("Front panel LEDs and buttons" on page 7).

Expansion board option

The server ships with 9 PCI Express expansion slots. Slots 1, 2, 3, 6, and 9 support dual-width expansion boards. If a dual-width expansion board is installed in slot 6 or 9, a x8 slot is lost.

For more information, see "I/O board components (on page 11)."

⚠️ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.

To install the component:

1. Power down the server (on page 23).
2. Remove all power:
a. Disconnect each power cord from the power source.
b. Disconnect each power cord from the server.

3. Extend or remove the server from the rack.
4. Remove the access panel (on page 27).
5. Open the expansion board retainer, and then remove the expansion slot cover.

6. Remove the PCI retainer screw.
7. Install the expansion board.

8. Close the expansion slot retainer.

9. Connect any required internal or external cables to the expansion board.

10. Install the access panel.

11. Install the server in the rack.

12. Connect each power cord to the server.

13. Connect each power cord to the power source.

14. Resume normal server operations.

**FBWC module and capacitor pack option**

⚠️ **CAUTION:** The cache module connector does not use the industry-standard DDR3 mini-DIMMs. Do not use the controller with cache modules designed for other controller models, because the controller can malfunction and you can lose data. Also, do not transfer this cache module to an unsupported controller model, because you can lose data.

To install the component:

1. Back up all data.

2. Close all applications.

3. Power down the server (on page 23).

4. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.

⚠️ **CAUTION:** In systems that use external data storage, be sure that the server is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server is powered up.

5. Extend the server from the rack (on page 23).

6. Remove the access panel (on page 27).
7. Remove the SPI board (on page 30).
8. Install the cache module.

9. Connect the cable.
10. Install the capacitor pack.

11. Install the SPI board.

12. Install the access panel.

13. Slide the server back into the rack.

14. Power up the server (on page 23).

**HP Trusted Platform Module option**

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the HP Product Bulletin website (http://www.hp.com/go/productbulletin).

Use these instructions to install and enable a TPM on a supported server. This procedure includes three sections:

1. Installing the Trusted Platform Module board (on page 68).
2. Retaining the recovery key/password (on page 68).
3. Enabling the Trusted Platform Module (on page 69).
   - Enabling the TPM requires accessing RBSU. For more information about RBSU, see the HP website (http://www.hp.com/support/rbsu).

TPM installation requires the use of drive encryption technology, such as the Microsoft Windows BitLocker Drive Encryption feature. For more information on BitLocker, see the Microsoft website (http://www.microsoft.com).

⚠️ **CAUTION:** Always observe the guidelines in this document. Failure to follow these guidelines can cause hardware damage or halt data access.

When installing or replacing a TPM, observe the following guidelines:

- Do not remove an installed TPM. Once installed, the TPM becomes a permanent part of the system board.
- When installing or replacing hardware, HP service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.
• When returning a system board for service replacement, do not remove the TPM from the system board. When requested, HP Service provides a TPM with the spare system board.
• Any attempt to remove an installed TPM from the system board breaks or disfigures the TPM security rivet. Upon locating a broken or disfigured rivet on an installed TPM, administrators should consider the system compromised and take appropriate measures to ensure the integrity of the system data.
• When using BitLocker, always retain the recovery key/password. The recovery key/password is required to enter Recovery Mode after BitLocker detects a possible compromise of system integrity.
• HP is not liable for blocked data access caused by improper TPM use. For operating instructions, see the encryption technology feature documentation provided by the operating system.

Retaining the recovery key/password

The recovery key/password is generated during BitLocker™ setup, and can be saved and printed after BitLocker™ is enabled. When using BitLocker™, always retain the recovery key/password. The recovery key/password is required to enter Recovery Mode after BitLocker™ detects a possible compromise of system integrity.

To help ensure maximum security, observe the following guidelines when retaining the recovery key/password:

• Always store the recovery key/password in multiple locations.
• Always store copies of the recovery key/password away from the server.
• Do not save the recovery key/password on the encrypted hard drive.

Installing the Trusted Platform Module board

⚠️ **WARNING:** To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

⚠️ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

1. Power down the server (on page 23).
2. Remove the access panel (on page 27).
3. Extend the server from the rack (on page 23).
4. Remove the SPI board (on page 30).
5. Locate the TPM connector.

⚠️ **CAUTION:** Any attempt to remove an installed TPM from the system board breaks or disfigures the TPM security rivet. Upon locating a broken or disfigured rivet on an installed TPM, administrators should consider the system compromised and take appropriate measures to ensure the integrity of the system data.
6. Install the TPM board. Press down on the connector to seat the board.

7. Install the TPM security rivet by pressing the rivet firmly into the system board.

8. Install the SPI board.
9. Install the access panel.
10. Slide the server back into the rack.
11. Power up the server (on page 23).

Enabling the Trusted Platform Module

1. During POST, press the F9 key to access System Configuration, and then select RBSU.
2. From the Main Menu, select Server Security.
4. From the Trusted Platform Module Menu, select TPM Functionality.
5. Select Enable, and then press the Enter key to modify the TPM Functionality setting.
6. Press the Esc key to exit the current menu, or press the F10 key to exit RBSU.
7. Reboot the server.
8. Enable the TPM in the OS. For OS-specific instructions, see the OS documentation.

⚠️ **CAUTION:** When a TPM is installed and enabled on the server, data access is locked if you fail to follow the proper procedures for updating the system or option firmware, replacing the system board, replacing a hard drive, or modifying OS application TPM settings.

For more information on firmware updates and hardware procedures, see the *HP Trusted Platform Module Best Practices White Paper* on the HP website ([http://www.hp.com/support](http://www.hp.com/support)).

For more information on adjusting TPM usage in BitLocker™, see the Microsoft website ([http://technet.microsoft.com/en-us/library/cc732774.aspx](http://technet.microsoft.com/en-us/library/cc732774.aspx)).
## Cabling

### Server cabling

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standby power cable</td>
</tr>
<tr>
<td>2</td>
<td>Power supply data cable</td>
</tr>
<tr>
<td>3</td>
<td>Front video/USB cable</td>
</tr>
<tr>
<td>4</td>
<td>Systems Insight Display cable</td>
</tr>
</tbody>
</table>
Software and configuration utilities

Server mode

The software and configuration utilities presented in this section operate in online mode, offline mode, or in both modes.

<table>
<thead>
<tr>
<th>Software or configuration utility</th>
<th>Server mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP iLO (on page 72)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>Active Health System (on page 73)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>Integrated Management Log (on page 74)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>Intelligent Provisioning (on page 74)</td>
<td>Offline</td>
</tr>
<tr>
<td>HP Insight Diagnostics (on page 75)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>HP Insight Remote Support software (on page 76)</td>
<td>Online</td>
</tr>
<tr>
<td>HP Insight Online (on page 77)</td>
<td>Online</td>
</tr>
<tr>
<td>Erase Utility (on page 75)</td>
<td>Offline</td>
</tr>
<tr>
<td>Scripting Toolkit (&quot;Scripting Toolkit for Windows and Linux&quot; on page 77)</td>
<td>Online</td>
</tr>
<tr>
<td>HP Service Pack for ProLiant (on page 77)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>HP Smart Update Manager (on page 78)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>HP ROM-Based Setup Utility</td>
<td>Offline</td>
</tr>
<tr>
<td>HP Smart Storage Administrator (on page 80)</td>
<td>Online and Offline</td>
</tr>
<tr>
<td>Option ROM Configuration for Arrays (on page 81)</td>
<td>Offline</td>
</tr>
<tr>
<td>ROMPaq utility (on page 81)</td>
<td>Offline</td>
</tr>
</tbody>
</table>

HP product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the HP Product Bulletin website (http://www.hp.com/go/productbulletin).

HP iLO Management

HP iLO Management is a set of embedded management features supporting the complete lifecycle of the server, from initial deployment through ongoing management.

HP iLO

The iLO subsystem is a standard component of HP ProLiant servers that simplifies initial server setup, server health monitoring, power and thermal optimization, and remote server administration. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system.
iLO enables and manages the Active Health System (on page 73) and also features Agentless Management. All key internal subsystems are monitored by iLO. SNMP alerts are sent directly by iLO regardless of the host operating system or even if no host operating system is installed.

HP Insight Remote Support software (on page 76) is also available in HP iLO with no operating system software, drivers, or agents.

Using iLO, you can do the following:

- Access a high-performance and secure Integrated Remote Console to the server from anywhere in the world if you have a network connection to the server.
- Use the shared iLO Remote Console to collaborate with up to four server administrators.
- Remotely mount high-performance Virtual Media devices to the server.
- Securely and remotely control the power state of the managed server.
- Implement true Agentless Management with SNMP alerts from HP iLO, regardless of the state of the host server.
- Access Active Health System troubleshooting features through the iLO interface.
- Register for HP Insight Remote Support software without installing any drivers or agents.

For more information about iLO features, see the iLO documentation on the HP website (http://www.hp.com/go/ilo/docs).

**Active Health System**

HP Active Health System provides the following features:

- Combined diagnostics tools/scanners
- Always on, continuous monitoring for increased stability and shorter downtimes
- Rich configuration history
- Health and service alerts
- Easy export and upload to Service and Support

The HP Active Health System monitors and records changes in the server hardware and system configuration. The Active Health System assists in diagnosing problems and delivering rapid resolution when server failures occur.

The Active Health System collects the following types of data:

- Server model
- Serial number
- Processor model and speed
- Storage capacity and speed
- Memory capacity and speed
- Firmware/BIOS

HP Active Health System does not collect information about Active Health System users' operations, finances, customers, employees, partners, or data center, such as IP addresses, host names, user names, and passwords. HP Active Health System does not parse or change operating system data from third-party error event log activities, such as content created or passed through by the operating system.
The data that is collected is managed according to the HP Data Privacy policy. For more information see the HP website (http://www.hp.com/go/privacy).

The Active Health System log, in conjunction with the system monitoring provided by Agentless Management or SNMP Pass-thru, provides continuous monitoring of hardware and configuration changes, system status, and service alerts for various server components.

The Agentless Management Service is available in the SPP, which is a disk image (.iso) that you can download from the HP website (http://www.hp.com/go/spp/download). The Active Health System log can be downloaded manually from iLO or HP Intelligent Provisioning and sent to HP.

For more information, see the following documents:
- HP iLO User Guide on the HP website (http://www.hp.com/go/ilo/docs)

**Integrated Management Log**

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:
- From within HP SIM
- From within operating system-specific IML viewers
  - For Windows: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO user interface
- From within HP Insight Diagnostics (on page 75)

**Intelligent Provisioning**

Several packaging changes have taken place with HP ProLiant Gen8 servers: SmartStart CDs and the Smart Update Firmware DVD no longer ship with these new servers. Instead, the deployment capability is embedded in the server as part of Intelligent Provisioning.

Intelligent Provisioning is a single-server deployment tool embedded in HP ProLiant Gen8 servers that simplifies HP ProLiant server setup, providing a reliable and consistent way to deploy HP ProLiant server configurations:
- Intelligent Provisioning assists with the OS installation process by preparing the system for installing “off-the-shelf” and HP branded versions of leading operating system software and integrating optimized HP ProLiant server support software.
- Intelligent Provisioning provides maintenance-related tasks through Perform Maintenance Options features.
- Intelligent Provisioning provides installation help for Microsoft Windows, Red Hat and SUSE Linux, and VMware operating systems. For specific OS support, see the HP Intelligent Provisioning Release Notes on the HP website (http://www.hp.com/go/intelligentprovisioning/docs).

For more information about Intelligent Provisioning software, see the HP website (http://www.hp.com/go/intelligentprovisioning). For Intelligent Provisioning recovery media downloads,
see the Resources tab on the HP website (http://www.hp.com/go/ilo). For consolidated drive and firmware update packages, see the HP Systems and Server Software Management page on the HP website (http://www.hp.com/go/SmartUpdate).

**HP Insight Diagnostics**

HP Insight Diagnostics is a proactive server management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, boot the server using Intelligent Provisioning (on page 74).

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server management. Available in Microsoft Windows and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, see the HP website (http://www.hp.com/servers/diags). HP Insight Diagnostics Online Edition is also available in the SPP ("HP Service Pack for ProLiant" on page 77).

**HP Insight Diagnostics survey functionality**

HP Insight Diagnostics (on page 75) provides survey functionality that gathers critical hardware and software information on ProLiant servers.

This functionality supports operating systems that are supported by the server. For operating systems supported by the server, see the HP website (http://www.hp.com/go/supportos).

If a significant change occurs between data-gathering intervals, the survey function marks the previous information and overwrites the survey data files to reflect the latest changes in the configuration.

Survey functionality is installed with every Intelligent Provisioning-assisted HP Insight Diagnostics installation, or it can be installed through the SPP ("HP Service Pack for ProLiant" on page 77).

**Erase Utility**

⚠️ **CAUTION:** Perform a backup before running the Erase Utility. The utility sets the system to its original factory state, deletes the current hardware configuration information, including array setup and disk partitioning, and erases all connected hard drives completely. Before using this utility, see the instructions in the *HP Intelligent Provisioning User Guide*.

Use the Erase Utility to erase drives and Active Health System logs, and to reset RBSU settings. Run the Erase Utility if you must erase the system for the following reasons:

- You want to install a new operating system on a server with an existing operating system.
- You encounter an error when completing the steps of a factory-installed operating system installation.

To access the Erase Utility, click the Perform Maintenance icon from the Intelligent Provisioning home screen, and then select Erase.

For more information about the Erase Utility, see the *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/intelligentprovisioning/docs).
HP Insight Remote Support software

HP strongly recommends that you register your device for remote support to enable enhanced delivery of your HP Warranty, HP Care Pack Service, or HP contractual support agreement. HP Insight Remote Support supplements your monitoring continuously to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product’s service level. Notifications may be sent to your authorized HP Channel Partner for onsite service, if configured and available in your country.

For more information, see HP Insight Remote Support and Insight Online Setup Guide for ProLiant Gen8 Servers and BladeSystem c-Class Enclosures on the HP website (http://www.hp.com/go/enterprise/docs). HP Insight Remote Support is available as part of HP Warranty, HP Care Pack Service, or HP contractual support agreement.

HP Insight Remote Support Direct Connect

When you use the embedded Remote Support functionality with a ProLiant Gen8 server or BladeSystem c-Class enclosure, you can register a server or enclosure to communicate directly to HP Insight Online without the need to set up an HP Insight Remote Support centralized Hosting Device in your local environment. HP Insight Online will be your primary interface for remote support information. The Direct Connect Remote Support configuration is available in iLO 4 1.40 and later, Intelligent Provisioning 1.60 and later, and Onboard Administrator 4.10 and later.

For more information, see the product documentation on the HP website (http://www.hp.com/go/insightremotesupport/docs).

HP Insight Remote Support Central Connect

When you use the embedded Remote Support functionality with a ProLiant Gen8 server or BladeSystem c-Class enclosure, you can register a server or enclosure to communicate to HP through an HP Insight Remote Support centralized Hosting Device in your local environment. All configuration and service event information is routed through the Hosting Device. This information can be viewed by using the local HP Insight Remote Support user interface or the web-based view in HP Insight Online.

The Central Connect Remote Support configuration is available in iLO 4 1.10 and later, Intelligent Provisioning 1.20 and later, and Onboard Administrator 3.60 and later.

For more information about the prerequisites, supported hardware, and associated operating systems for central connect, see HP Insight Remote Support Release Notes on the HP website (http://www.hp.com/go/insightremotesupport/docs).

HP Insight Control Server Provisioning

Starting with Insight Control 7.3.1, Insight Control server provisioning replaces Insight Control server deployment (RDP) as the primary multi-server provisioning capability for Insight Control and the HP CloudSystem. Insight Control server provisioning enables you to install and configure HP ProLiant Servers and simplify the process for deploying operating systems on HP ProLiant servers. Insight Control server provisioning is pre-installed on a virtual machine, referred to as a virtual appliance, optimized to run the application.

Insight Control server provisioning enables you to:

- Install Microsoft Windows, Linux, VMware ESXi, and Hyper-V on ProLiant servers
Update drivers, utilities, and firmware on ProLiant servers using the SPP
Configure ProLiant system hardware, iLOs, BIOS, and HP SmartArray
Deploy to target servers with or without PXE (HP ProLiant Gen8 and later)
Run deployment jobs on multiple servers simultaneously
Customize your HP ProLiant deployments with an easy to use browser-based interface

For more information about Insight Control server provisioning, see the HP website (http://www.hp.com/go/insightcontrol).

**HP Insight Online**

HP Insight Online is a capability of the HP Support Center portal. Combined with HP Insight Remote Support 7.x, it automatically aggregates device health, asset, and support information from iLO Management with contract and warranty information, and then secures it in a single, personalized dashboard that is viewable from anywhere at any time. The dashboard organizes your IT and service data to help you understand and respond to that information more quickly. With specific authorization from you, an authorized HP Channel Partner can also view your IT environment remotely at HP Insight Online.

For more information, see the following documents:

- For more information about using HP Insight Online, see the *HP Insight Online User’s Guide*.
- For more information about installing HP Insight Remote Support and enabling HP Insight Online, see the *HP Insight Remote Support and Insight Online Setup Guide for ProLiant Gen8 Servers and BladeSystem c-Class Enclosures*.

These documents are available on the HP website (http://www.hp.com/go/insightremotesupport/docs).

**Scripting Toolkit for Windows and Linux**

The Scripting Toolkit for Windows and Linux is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The Scripting Toolkit is designed to support ProLiant BL, ML, DL, and SL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these tools to build an automated server deployment process.

The Scripting Toolkit provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each deployment, making it possible to scale rapid, high-volume server deployments.

For more information, and to download the Scripting Toolkit, see the HP website (http://www.hp.com/go/ProLiant/STK).

**HP Service Pack for ProLiant**

SPP is a comprehensive systems software (drivers and firmware) solution delivered as a single ISO file with major server releases. This solution uses HP SUM as the deployment tool and is tested on all supported HP ProLiant servers including HP ProLiant Gen8 servers.

SPP can be used in an online mode on a Windows or Linux hosted operating system, or in an offline mode where the server is booted to an operating system included on the ISO file so that the server can be updated automatically with no user interaction or updated in interactive mode.
For more information or to download SPP, see one of the following pages on the HP website:

- HP Service Pack for ProLiant download page (http://www.hp.com/go/spp)
- HP Systems and Server Software Management page (http://www.hp.com/go/SmartUpdate)

**HP Smart Update Manager**

HP SUM is a product used to install and update firmware, drivers, and systems software on HP ProLiant servers. HP SUM provides a GUI and a command-line scriptable interface for deployment of systems software for single or one-to-many HP ProLiant servers and network-based targets, such as iLOs, OAs, and VC Ethernet and Fibre Channel modules.

For more information about HP SUM, see the product page on the HP website (http://www.hp.com/go/hpsum).

To download HP SUM, see the HP website (http://www.hp.com/go/hpsum/download).

To access the *HP Smart Update Manager User Guide*, see the HP SUM Information Library (http://www.hp.com/go/hpsum/documentation).

**HP UEFI System Utilities**

For servers that support UEFI, the HP UEFI System Utilities is embedded in the system ROM. The UEFI System Utilities enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options
- Enabling and disabling system features
- Displaying system information
- Selecting the primary boot controller
- Configuring memory options
- Selecting a language
- Launching other pre-boot environments such as the Embedded UEFI Shell and Intelligent Provisioning

For more information on the HP UEFI System Utilities, see the *HP UEFI System Utilities User Guide* on the HP website (http://www.hp.com/go/uefi/docs).

**Using HP UEFI System Utilities**

To use the System Utilities, use the following keys:

<table>
<thead>
<tr>
<th>Action</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access System Utilities</td>
<td>F9 during server POST</td>
</tr>
<tr>
<td>Navigate menus</td>
<td>Up and Down arrows</td>
</tr>
<tr>
<td>Select items</td>
<td>Enter</td>
</tr>
<tr>
<td>Save selections</td>
<td>F10</td>
</tr>
<tr>
<td>Access Help for a highlighted configuration option</td>
<td>F1</td>
</tr>
</tbody>
</table>

Default configuration settings are applied to the server at one of the following times:

- Upon the first system power-up
After defaults have been restored

Default configuration settings are sufficient for typical server operations; however, you can modify configuration settings as needed. The system prompts you for access to the System Utilities each time the system is powered up.

**Flexible boot control**

This feature enables you to do the following:

- **Add Boot Options**
  - Browse all FAT16 and FAT32 file systems.
  - Select an X64 UEFI application with an .EFI extension to add as a new UEFI boot option, such as an OS boot loader or other UEFI application.

  The new boot option is appended to the boot order list. When you select a file, you are prompted to enter the boot option description (which is then displayed in the Boot menu), as well as any optional data to be passed to an .EFI application.

- **Boot to System Utilities**

  Toward the end of the boot process, the boot options screen appears. This screen is visible for several seconds before the system attempts to boot from a supported boot device. During this time, you can access the System Utilities by pressing the **F9** key.

- **Choose between supported modes: Legacy BIOS Boot Mode or UEFI Boot Mode**

  **IMPORTANT:** If the default boot mode settings are different than the user defined settings, the system may not boot the OS installation if the defaults are restored. To avoid this issue, use the User Defined Defaults feature in UEFI System Utilities to override the factory default settings.

  For more information, see the [HP UEFI System Utilities User Guide](http://www.hp.com/go/uefi/docs) on the HP website.

**Restoring and customizing configuration settings**

You can reset all configuration settings to the factory default settings, or you can restore system default configuration settings, which are used instead of the factory default settings.

You can also configure default settings as necessary, and then save the configuration as the custom default configuration. When the system loads the default settings, it uses the custom default settings instead of the factory defaults.

**Secure Boot configuration**

Secure Boot is integrated in the UEFI specification on which the HP implementation of UEFI is based. Secure Boot is completely implemented in the BIOS and does not require special hardware. It ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards
- UEFI drivers loaded from mass storage devices
- Pre-boot UEFI shell applications
• OS UEFI boot loaders

Once enabled, only firmware components and operating systems with boot loaders that have an appropriate digital signature can execute during the boot process. Only operating systems that support Secure Boot and have an EFI boot loader signed with one of the authorized keys can boot when Secure Boot is enabled. For more information about supported operating systems, see the HP UEFI System Utilities Release Notes on the HP website (http://www.hp.com/go/uefi/docs).

A physically present user can customize the certificates embedded in the UEFI BIOS by adding/removing their own certificates.

Embedded UEFI shell

The system BIOS in all HP ProLiant DL580 Gen8 servers includes an embedded UEFI Shell in the ROM. The UEFI Shell environment provides an API, a command line prompt, and a set of CLIs that allow scripting, file manipulation, and system information. These features enhance the capabilities of the UEFI System Utilities.

For more information, see the following documents:
• UEFI Shell Specification on the UEFI website (http://www.uefi.org/specifications).

Re-entering the server serial number and product ID

After you replace the SPI board, you must re-enter the server serial number and the product ID.

1. During the server startup sequence, press the F9 key to access System Utilities.
2. From the System Utilities screen, select System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Advanced System ROM Options > Serial Number, and then press the Enter key.
3. Enter the serial number and press the Enter key. The following message appears:
   The serial number should only be modified by qualified service personnel. This value should always match the serial number located on the chassis.
4. Press the Enter key to clear the warning.
5. Enter the serial number and press the Enter key.
6. Select Product ID. The following warning appears:
   Warning: The Product ID should ONLY be modified by qualified service personnel. This value should always match the Product ID located on the chassis.
7. Enter the product ID and press the Enter key.
8. Press the F10 key to confirm exiting System Utilities. The server automatically reboots.

Utilities and features

HP Smart Storage Administrator

HP SSA is a configuration and management tool for HP Smart Array controllers. Starting with HP ProLiant Gen8 servers, HP SSA replaces ACU with an enhanced GUI and additional configuration features.
HP SSA exists in three interface formats: the HP SSA GUI, the HP SSA CLI, and HP SSA Scripting. Although all formats provide support for configuration tasks, some of the advanced tasks are available in only one format.

Some HP SSA features include the following:

- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Suggests the optimal configuration for an unconfigured system
- Provides diagnostic and SmartSSD Wear Gauge functionality on the Diagnostics tab
- For supported controllers, provides access to additional features.

For more information about HP SSA, see the HP website (http://www.hp.com/go/hpssa).

Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility also provides support for the following functions:

- Reconfiguring one or more logical drives
- Viewing the current logical drive configuration
- Deleting a logical drive configuration
- Setting the controller to be the boot controller
- Selecting the boot volume

If you do not use the utility, ORCA will default to the standard configuration.

For more information regarding the default configurations that ORCA uses, see the HP ROM-Based Setup Utility User Guide on the HP RBSU Information Library (http://www.hp.com/go/rbsu/docs).

For more information about the storage controller and its features, select the relevant controller user documentation on the HP website (http://www.hp.com/go/smartstorage/docs).

To configure arrays, see the HP Smart Storage Administrator User Guide on the HP website (http://www.hp.com/go/smartstorage/docs).

ROMPaq utility

The ROMPaq utility enables you to upgrade the system firmware (BIOS). To upgrade the firmware, insert a ROMPaq USB Key into an available USB port and boot the system. In addition to ROMPaq, Online Flash Components for Windows and Linux operating systems are available for updating the system firmware.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available firmware revisions.

For more information, go to the HP website (http://www.hp.com/go/hpsc) and click on Drivers, Software & Firmware. Then, enter your product name in the Find an HP product field and click Go.
Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND (does not apply to HP ProLiant DL980 Servers), or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the System Management Homepage or through RBSU.

USB support

HP provides both standard USB 2.0 support and legacy USB 2.0 support. Standard support is provided by the OS through the appropriate USB device drivers. Before the OS loads, HP provides support for USB devices through legacy USB support, which is enabled by default in the system ROM.

Legacy USB support provides USB functionality in environments where USB support is not available normally. Specifically, HP provides legacy USB functionality for the following:

- POST (system boot)
- UEFI System Utilities
- Pre-boot UEFI shell
- DOS
- Operating environments which do not provide native USB support

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a single ROM that acts as two separate ROM images. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

NOTE: The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

Keeping the system current

Drivers
IMPORTANT: Always perform a backup before installing or updating device drivers.

The server includes new hardware that may not have driver support on all OS installation media.

If you are installing an Intelligent Provisioning-supported OS, use Intelligent Provisioning (on page 74) and its Configure and Install feature to install the OS and latest supported drivers.

If you do not use Intelligent Provisioning to install an OS, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded as part of an SPP.

If you are installing drivers from SPP, be sure that you are using the latest SPP version that your server supports. To verify that your server is using the latest supported version and for more information about SPP, see the HP website (http://www.hp.com/go/spp/download).

To locate the drivers for a particular server, go to the HP website (http://www.hp.com/go/hpsc) and click on Drivers, Software & Firmware. Then, enter your product name in the Find an HP product field and click Go.

Software and firmware

Software and firmware should be updated before using the server for the first time, unless any installed software or components require an older version.

For system software and firmware updates, use one of the following sources:

- Download the SPP (“HP Service Pack for ProLiant” on page 77) from the HP Service Pack for ProLiant download page (http://www.hp.com/go/spp).
- Download individual drivers, firmware, or other systems software components from the server product page in the HP Support Center (http://www.hp.com/go/hpsc).

Version control

The VCRM and VCA are web-enabled Insight Management Agents tools that HP SIM uses to schedule software update tasks to the entire enterprise.

- VCRM manages the repository for SPP. Administrators can view the SPP contents or configure VCRM to automatically update the repository with internet downloads of the latest software and firmware from HP.
- VCA compares installed software versions on the node with updates available in the VCRM managed repository. Administrators configure VCA to point to a repository managed by VCRM.


HP operating systems and virtualization software support for ProLiant servers

For information about specific versions of a supported operating system, see the HP website (http://www.hp.com/go/ossupport).
HP Technology Service Portfolio

HP Technology Services offers a targeted set of consultancy, deployment, and service solutions to meet the support needs of most business and IT environments.

**Foundation Care services**—Delivers scalable hardware and software support packages for HP ProLiant server and industry-standard software. You can choose the type and level of service that is most suitable for your business needs.

**HP Collaborative Support**—With a single call, HP addresses initial hardware and software support needs and helps to quickly identify if a problem is related to hardware or software. If the problem is related to hardware, HP resolves the problem according to service level commitments. If the reported incident is related to an HP software product or a supported third-party software product and cannot be resolved by applying known fixes, HP contacts the third-party vendor and creates a problem incident on your behalf.

**HP Proactive Care**—For customers running business critical environments where downtime is not an option, HP Proactive Care helps to deliver high levels of availability. Key to these service options is the delivery of proactive service management tools to help you avoid the causes of downtime. If a problem arises, then HP offers advanced technical response from critical system support specialists for problem identification and resolution.

**HP Support Center**—For all service options, the HP Support Center delivers the information, tools, and experts required to support HP business products.

**HP Insight Remote Support**—Provides 24x7 secure remote monitoring, diagnosis, and problem resolution.

For more information, see one of the following websites:
- HP ProLiant Server Services website (http://www.hp.com/services/proliant)
- HP BladeSystem Services website (http://www.hp.com/services/bladesystem)

Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (http://www.hp.com/go/pcn).
Troubleshooting resources

The *HP ProLiant Gen8 Troubleshooting Guide, Volume I: Troubleshooting* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance on ProLiant servers and server blades. To view the guide, select a language:

- English ([http://www.hp.com/support/ProLiant_TSG_v1_en](http://www.hp.com/support/ProLiant_TSG_v1_en))
- French ([http://www.hp.com/support/ProLiant_TSG_v1_fr](http://www.hp.com/support/ProLiant_TSG_v1_fr))
- Spanish ([http://www.hp.com/support/ProLiant_TSG_v1_sp](http://www.hp.com/support/ProLiant_TSG_v1_sp))
- German ([http://www.hp.com/support/ProLiant_TSG_v1_gr](http://www.hp.com/support/ProLiant_TSG_v1_gr))
- Japanese ([http://www.hp.com/support/ProLiant_TSG_v1_jp](http://www.hp.com/support/ProLiant_TSG_v1_jp))
- Simplified Chinese ([http://www.hp.com/support/ProLiant_TSG_v1_sc](http://www.hp.com/support/ProLiant_TSG_v1_sc))

The *HP ProLiant Gen8 Troubleshooting Guide, Volume II: Error Messages* provides a list of error messages and information to assist with interpreting and resolving error messages on ProLiant servers and server blades. To view the guide, select a language:

- English ([http://www.hp.com/support/ProLiant_EMG_v1_en](http://www.hp.com/support/ProLiant_EMG_v1_en))
- French ([http://www.hp.com/support/ProLiant_EMG_v1_fr](http://www.hp.com/support/ProLiant_EMG_v1_fr))
- Spanish ([http://www.hp.com/support/ProLiant_EMG_v1_sp](http://www.hp.com/support/ProLiant_EMG_v1_sp))
- German ([http://www.hp.com/support/ProLiant_EMG_v1_gr](http://www.hp.com/support/ProLiant_EMG_v1_gr))
- Japanese ([http://www.hp.com/support/ProLiant_EMG_v1_jp](http://www.hp.com/support/ProLiant_EMG_v1_jp))
- Simplified Chinese ([http://www.hp.com/support/ProLiant_EMG_v1_sc](http://www.hp.com/support/ProLiant_EMG_v1_sc))
Battery replacement

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

⚠️ **WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:
- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

To remove the component:
1. Power down the server (on page 23).
2. Remove all power:
   - a. Disconnect each power cord from the power source.
   - b. Disconnect each power cord from the server.
3. Extend the server from the rack (on page 23).
4. Remove the access panel (on page 27).
5. Remove the SPI board (on page 30).
6. Remove the battery.

💡 **IMPORTANT:** Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through UEFI System Utilities.
**IMPORTANT:** To avoid a mismatch between boot modes, HP recommends setting system maintenance switch 7 to the same BIOS boot mode the server is deployed in. Otherwise, the storage controller may not recognize the OS installed on the storage media.

For more information, see "System Maintenance Switch (on page 12)."

To replace the component, reverse the removal procedure.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.
Regulatory information

Safety and regulatory compliance


Belarus Kazakhstan Russia marking

EAC

Manufacturer
Hewlett-Packard Company, Address: 3000 Hanover Street, Palo Alto, California 94304, U.S.

Local representative information (Russian)

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- HP Kazakhstan
  ТОО «Хьюлетт-Паккард (К), 050040, Казахстан, г. Алматы, Бостандыкский район, ул. Тимирязева, 28В, 1 этаж, тел./факс: +7 (727) 355 35 50, +7 (727) 355 35 51

Local representative information (Kazakh)

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Manufacturing date

The manufacturing date is defined by the serial number (HP serial number format for this product): CCSYWWZ2ZZZ
Valid date formats include the following:

- **YWW**, where Y indicates the year counting from within each new decade, with 2000 as the starting point. For example, 238: 2 for 2002 and 38 for the week of September 9. In addition, 2010 is indicated by 0, 2011 by 1, 2012 by 2, 2013 by 3, and so forth.

- **YYWW**, where YY indicates the year, using a base year of 2000. For example, 0238: 02 for 2002 and 38 for the week of September 9.

**Turkey RoHS material content declaration**

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

**Ukraine RoHS material content declaration**

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057

**Warranty information**

HP ProLiant and X86 Servers and Options (http://www.hp.com/support/ProLiantServers-Warranties)

HP Enterprise Servers (http://www.hp.com/support/EnterpriseServers-Warranties)

HP Storage Products (http://www.hp.com/support/Storage-Warranties)

HP Networking Products (http://www.hp.com/support/Networking-Warranties)
Electrostatic discharge

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.
Specifications

Environmental specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range*</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10°C to 35°C (50°F to 95°F)</td>
</tr>
<tr>
<td>Shipping</td>
<td>-40°C to 70°C (-40°F to 158°F)</td>
</tr>
<tr>
<td>Maximum wet bulb temperature</td>
<td>28°C (82.4°F)</td>
</tr>
<tr>
<td>Relative humidity (noncondensing)**</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 90%</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
</tr>
</tbody>
</table>

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3,048 m (10,000 ft) is applicable. No direct sunlight allowed.
** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 kPa.

Mechanical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>17.5 cm (6.88 in)</td>
</tr>
<tr>
<td>Depth</td>
<td>73.6 cm (29 in)</td>
</tr>
<tr>
<td>Width</td>
<td>44.4 cm (17.48 in)</td>
</tr>
<tr>
<td>Weight (maximum)</td>
<td>52.87 kg (116.56 lb)</td>
</tr>
<tr>
<td>Weight (no drives installed)</td>
<td>32.18 kg (70.94 lb)</td>
</tr>
</tbody>
</table>

Power supply specifications

Depending on installed options, the server is configured with one of the following power supplies:

- HP 1200 W Common Slot Platinum Plus Hot-Plug Power Supply (94% efficiency) (on page 92)
- HP 1500 W Common Slot Platinum Plus Hot-Plug Power Supply (94% efficiency) (on page 92)

For detailed power supply specifications, see the server QuickSpecs on the HP website (http://www.hp.com/go/hpsc).
## HP 1200 W Common Slot Platinum Plus Hot-Plug Power Supply (94% efficiency)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Rated input voltage</td>
<td>100 VAC, 100 to 120 VAC</td>
</tr>
<tr>
<td>Rated input frequency</td>
<td>50 Hz to 60 Hz</td>
</tr>
<tr>
<td>Rated input current</td>
<td>9.2 A at 100 VAC</td>
</tr>
<tr>
<td></td>
<td>9.5 A at 110 to 120 VAC</td>
</tr>
<tr>
<td></td>
<td>6.6 A at 200 to 240 VAC</td>
</tr>
<tr>
<td>Maximum rated input power</td>
<td>1000 W at 120 VAC input</td>
</tr>
<tr>
<td></td>
<td>1320 W at 230 VAC input</td>
</tr>
<tr>
<td>BTUs per hour</td>
<td>3408 at 120 VAC input</td>
</tr>
<tr>
<td></td>
<td>4500 at 230 VAC input</td>
</tr>
<tr>
<td><strong>Power supply output</strong></td>
<td></td>
</tr>
<tr>
<td>Power supply output</td>
<td>800 W at 100 VAC input (low line)</td>
</tr>
<tr>
<td></td>
<td>900 W at 108 V to 132 V AC input (low line)</td>
</tr>
<tr>
<td></td>
<td>1200 W at 200 V to 240 V AC input (High line)</td>
</tr>
<tr>
<td>Rated steady-state power</td>
<td>800 W at 100 VAC input</td>
</tr>
<tr>
<td></td>
<td>900 W at 120 VAC input</td>
</tr>
<tr>
<td></td>
<td>1200 W at 200 V to 240 V AC input</td>
</tr>
<tr>
<td>Maximum peak power</td>
<td>800 W at 100 VAC input</td>
</tr>
<tr>
<td></td>
<td>900 W at 120 VAC input</td>
</tr>
<tr>
<td></td>
<td>1200 W at 200 V to 240 V AC input</td>
</tr>
</tbody>
</table>

## HP 1500 W Common Slot Platinum Plus Hot-Plug Power Supply (94% efficiency)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Rated input voltage</td>
<td>200 to 240 VAC</td>
</tr>
<tr>
<td>Rated input frequency</td>
<td>50 Hz to 60 Hz</td>
</tr>
<tr>
<td>Rated input current</td>
<td>8.3 A at 200 VAC</td>
</tr>
<tr>
<td>Maximum rated input power</td>
<td>1652 W at 230 VAC input</td>
</tr>
<tr>
<td>BTUs per hour</td>
<td>5637 at 230 VAC input</td>
</tr>
<tr>
<td><strong>Power supply output</strong></td>
<td></td>
</tr>
<tr>
<td>Power supply output</td>
<td>1500 W</td>
</tr>
<tr>
<td>Rated steady-state power</td>
<td>1500 W at 200 V to 240 V AC input</td>
</tr>
<tr>
<td>Maximum peak power</td>
<td>1500 W at 200 V to 240 V AC input</td>
</tr>
</tbody>
</table>
Support and other resources

Before you contact HP

Be sure to have the following information available before you call HP:

- **Active Health System log (HP ProLiant Gen8 or later products)**
  Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the HP iLO 4 User Guide or HP Intelligent Provisioning User Guide on the HP website (http://www.hp.com/go/ilo/docs).

- **Onboard Administrator SHOW ALL report (for HP BladeSystem products only)**
  For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (http://www.hp.com/go/OAlog).

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Customer Self Repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service
providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

**NOTE:** Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP’s Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website (http://www.hp.com/go/selfrepair).

**Réparation par le client (CSR)**

Les produits HP comportent de nombreuses pièces CSR (Customer Self Repair = réparation par le client) afin de minimiser les délais de réparation et faciliter le remplacement des pièces défectueuses. Si pendant la période de diagnostic, HP (ou ses partenaires ou mainteneurs agréés) détermine que la réparation peut être effectuée à l’aide d’une pièce CSR, HP vous l’envoie directement. Il existe deux catégories de pièces CSR:

- **Obligatoire** - Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d’œuvre du service vous seront facturés.

- **Facultatif** - Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d’effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l’intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

**REMARQUE:** Certaines pièces HP ne sont pas conçues pour permettre au client d’effectuer lui-même la réparation. Pour que la garantie puisse s’appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

Les pièces CSR sont livrées le jour ouvré suivant, dans la limite des stocks disponibles et selon votre situation géographique. Si votre situation géographique le permet et que vous demandez une livraison le jour même ou dans les 4 heures, celle-ci vous sera facturée. Pour bénéficier d’une assistance téléphonique, appelez le Centre d’assistance technique HP. Dans les documents envoyés avec la pièce de rechange CSR, HP précise s’il est nécessaire de lui retourner la pièce défectueuse. Si c’est le cas, vous devez le faire dans le délai indiqué, généralement cinq (5) jours ouvrés. La pièce et sa documentation doivent être retournées dans l’emballage fourni. Si vous ne retournez pas la pièce défectueuse, HP se réserve le droit de vous facturer les coûts de remplacement. Dans le cas d’une pièce CSR, HP supporte l’ensemble des frais d’expédition et de retour, et détermine la société de courses ou le transporteur à utiliser.

Riparazione da parte del cliente

Per abbreviare i tempi di riparazione e garantire una maggiore flessibilità nella sostituzione di parti difettose, i prodotti HP sono realizzati con numerosi componenti che possono essere riparati direttamente dal cliente (CSR, Customer Self Repair). Se in fase di diagnostica HP (o un centro di servizi o di assistenza HP) identifica il guasto come riparabile mediante un ricambio CSR, HP lo spedirà direttamente al cliente per la sostituzione. Vi sono due categorie di parti CSR:

Obbligatorie – Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

Opzionali – Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

NOTA: alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un “No” nel Catalogo illustrato dei componenti.

In base alla disponibilità e alla località geografica, le parti CSR vengono spedite con consegna entro il giorno lavorativo seguente. La consegna nel giorno stesso o entro quattro ore è offerta con un supplemento di costo solo in alcune zone. In caso di necessità si può richiedere l’assistenza telefonica di un addetto del centro di supporto tecnico HP. Nel materiale fornito con una parte di ricambio CSR, HP specifica se il cliente deve restituire dei componenti. Qualora sia richiesta la resa ad HP del componente difettoso, lo si deve spedire ad HP entro un determinato periodo di tempo, generalmente cinque (5) giorni lavorativi. Il componente difettoso deve essere restituito con la documentazione associata nell’imballo di spedizione fornito. La mancata restituzione del componente può comportare la fatturazione del ricambio da parte di HP.


Customer Self Repair

HP Produkte enthalten viele CSR-Teile (Customer Self Repair), um Reparaturzeiten zu minimieren und höhere Flexibilität beim Austausch defekter Bauteile zu ermöglichen. Wenn HP (oder ein HP Servicepartner) bei der Diagnose feststellt, dass das Produkt mithilfe eines CSR-Teils repariert werden kann, sendet Ihnen HP dieses Bauteil zum Austausch direkt zu. CSR-Teile werden in zwei Kategorien unterteilt:


Reparaciones del propio cliente

Los productos de HP incluyen muchos componentes que el propio usuario puede reemplazar (Customer Self Repair, CSR) para minimizar el tiempo de reparación y ofrecer una mayor flexibilidad a la hora de realizar sustituciones de componentes defectuosos. Si, durante la fase de diagnóstico, HP (o los proveedores o socios de servicio de HP) identifica que una reparación puede llevarse a cabo mediante el uso de un componente CSR, HP le enviará dicho componente directamente para que realice su sustitución. Los componentes CSR se clasifican en dos categorías:

- **Obligatorio:** componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
- **Opcional:** componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

**NOTA:** Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

Según la disponibilidad y la situación geográfica, los componentes CSR se enviarán para que lleguen a su destino al siguiente día laborable. Si la situación geográfica lo permite, se puede solicitar la entrega en el mismo día o en cuatro horas con un coste adicional. Si precisa asistencia técnica, puede llamar al Centro de asistencia técnica de HP y recibirá ayuda telefónica por parte de un técnico. Con el envío de materiales para la sustitución de componentes CSR, HP especificará si los componentes defectuosos deberán devolverse a HP. En aquellos casos en los que sea necesario devolver algún componente a HP, deberá hacerlo en el periodo de tiempo especificado, normalmente cinco días laborables. Los componentes defectuosos deberán devolverse con toda la documentación relacionada y con el embalaje de envío. Si no enviara el componente defectuoso requerido, HP podrá cobrarle por el de sustitución. En el caso de todas
Customer Self Repair

Veel onderdelen in HP producten zijn door de klant zelf te repareren, waardoor de reparatieduur tot een minimum beperkt kan blijven en de flexibiliteit in het vervangen van defecte onderdelen groter is. Deze onderdelen worden CSR-onderdelen (Customer Self Repair) genoemd. Als HP (of een HP Service Partner) bij de diagnose vaststelt dat de reparatie kan worden uitgevoerd met een CSR-onderdeel, verzendt HP dat onderdeel rechtstreeks naar u, zodat u het defecte onderdeel daarmee kunt vervangen. Er zijn twee categorieën CSR-onderdelen:

Verplicht: Onderdelen waarvoor reparatie door de klant verplicht is. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

Optioneel: Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantiservice voor het product.

OPMERKING: Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

Afhankelijk van de leverbaarheid en de locatie worden CSR-onderdelen verzonden voor levering op de eerstvolgende werkdag. Levering op dezelfde dag of binnen vier uur kan tegen meerkosten worden aangeboden, indien dit mogelijk is gezien de locatie en de leverbaarheid. Indien assistentie gewenst is, belt u een HP Service Partner om technische ondersteuning te ontvangen. HP vermeldt in de documentatie bij het vervangende CSR-onderdeel of het defecte onderdeel aan HP moet worden geretourneerd. Als het defecte onderdeel aan HP moet worden geretourneerd, moet u het defecte onderdeel binnen een bepaalde periode, gewoonlijk vijf (5) werkdagen, retourneren aan HP. Bij reparatie door de klant betaalt HP alle verzendkosten voor het vervangende en geretourneerde onderdeel en kiest HP zelf welke koerier/transportonderneming hiervoor wordt gebruikt.

Neem contact op met een Service Partner voor meer informatie over het Customer Self Repair programma van HP. Informatie over Service Partners vindt u op de HP website (http://www.hp.com/go/selfrepair).

Reparo feito pelo cliente

Os produtos da HP são projetados com muitas peças para reparo feito pelo cliente (CSR) de modo a minimizar o tempo de reparo e permitir maior flexibilidade na substituição de peças com defeito. Se, durante o período de diagnóstico, a HP (ou fornecedores/parceiros de serviço da HP) concluir que o reparo pode ser efetuado pelo uso de uma peça CSR, a peça de reposição será enviada diretamente ao cliente. Existem duas categorias de peças CSR:

Obrigatória – Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.
Opcional – Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

**OBSERVAÇÃO:** Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

Conforme a disponibilidade e o local geográfico, as peças CSR serão enviadas no primeiro dia útil após o pedido. Onde as condições geográficas permitirem, a entrega no mesmo dia ou em quatro horas pode ser feita mediante uma taxa adicional. Se precisar de auxílio, entre em contato com o Centro de suporte técnico da HP para que um técnico o ajude por telefone. A HP especifica nos materiais fornecidos com a peça CSR de reposição se a peça com defeito deve ser devolvida à HP. Nos casos em que isso for necessário, é preciso enviar a peça com defeito à HP dentro do período determinado, normalmente cinco (5) dias úteis. A peça com defeito deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso não o faça, a HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, a HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.


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**カスタマーサービスエリア**

修理時間を短縮し、故障部品の交換における高い柔軟性を確保するために、HP製品には多数のCSR部品があります。診断の際に、CSR部品を使用すれば修理ができます。HPはその部品を直接、お客様に発送し、お客様に交換していただきます。CSR部品は以下の2通りがあります。

- **必須・カスタマーサービスエリア**が必須の部品。当該部品についても、もしお客様がHPに交換作業を依頼される場合、その修理サービスに関する交通費および人件費がお客様に請求されます。
- **任意・カスタマーサービスエリア**が任意である部品。この部品もカスタマーサービスエリア用です。当該部品についても、もしお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内において、別途費用を負担していただくことなく保証サービスを受けることができます。

注： HP製品の一部の部品は、カスタマーサービスエリア用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品がカスタマーサービスエリア除外品である旨が記載されています。

部品供給が可能な場合、地域によっては、CSR部品を翌営業日に届くように発送します。また、地域によっては、追加費用を負担いただくことにより当日または4時間以内に届くように発送することも可能な場合があります。サポートが必要なときは、HPの修理受付窓口に電話していただければ、技術者が電話でアドバイスします。交換用のCSR部品または同様物には、故障部品をHPに返送する必要があるかどうかが表示されています。故障部品をHPに返送する必要がある場合は、指定期限内（通常は営業日以内）に故障部品をHPに返送してください。故障部品を返送する場合は、届いた時の梱包書類に関連書類ともに入れてください。故障部品を返送しない場合、HPから部品費用が請求されます。カスタマーサービスエリアの際には、HPは送料および部品返送費用を負担し、使用する宅配便会社や運送会社を指定します。
客户自行维修

HP 产品提供许多客户自行维修 (CSR) 部件，以尽可能缩短维修时间和在更换缺陷部件方面提供更大的灵活性。如果在诊断期间 HP（或 HP 服务提供商或服务合作伙伴）确定可以通过使用 CSR 部件完成维修，HP 将直接把该部件发给进行更换。有两类 CSR 部件：

- 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为此服务支付差旅费和人工费用。
- 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据您的产品指定的保修服务类型，HP 可能收取费用或不再收取任何附加费用。

注：某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

CSR 部件将在下一个工作日发出（取决于备货情况和允许的地理范围）。在允许的地理范围内，可在当天或四小时内发出，但要收取额外费用。如果需要帮助，您可以致电 HP 技术支持中心，将有技术人员通过电话为您提供帮助。HP 会在随更换的 CSR 部件发送的材料中注明是否必须将有缺陷的部件返还给 HP。如果要求您将有缺陷的部件返还给 HP，那么您必须在规定期内（通常是五个工作日）将缺陷部件发给 HP，有缺陷的部件必须随所发送的卸货材料中的相关文件一起返还。如果未能返还有缺陷的部件，HP 可能会要求您支付更换费用。客户自行维修时，HP 将承担所有相关运输和部分退货费用，并指定快递商/承运商。

有关 HP 客户自行维修计划的详细信息，请与您当地的 HP 服务提供商联系。有关北美地区的计划，请访问 HP 网站 (http://www.hp.com/go/selfrepair)。

客戶自行維修

HP 產品設有許多「客戶自行維修」(CSR) 的零件以減少維修時間，並且使得更換瑕疵零件時能有更大的彈性。在沒有補貨設備下，客戶可在當天或四小時內出貨，但要收取額外費用。如需產品維修，您可以致電 HP 技術支援中心，將會有專業人員通過電話為您維修。HP 會隨更換的 CSR 部件發送的料件中注明是否必須將有瑕疵的部件還給 HP。如果要求您將有瑕疵的部件還給 HP，那麼您必須在規定期限內（通常是五個工作日）将瑕疵部件發給 HP，有瑕疵的部件必須隨所發送的卸貨材料中的相關文件一起還換。如果未能還換有瑕疵的部件，HP 可能會要求您支付還換費用。客戶自行維修時，HP 將承擔所有相關運輸和部分還換費用，並指定快递商/承運商。

備註：某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

基於材料取得及環保允許的情況下，CSR 部件及於其他工作日可快速送到。如在這樣的允許下當天或四小時內出貨，則可能會需要額外的費用。若您需要補貨，可致電「HP 技術支援中心」，會有技術人員透過電話來協助您。不論損壞的部件是否必須還換，HP 皆會在與 CSR 替換部件一起運送的材料中註明。若要將損壞的零件退回 HP，客戶必須在指定的時間內（通常為五個工作日）將損壞的部件寄回 HP。損壞的部件必須與寄送資料中隨附的相關技術文件一併運送。如果無法還換損壞的零件，HP 可能要向您收取替代費用。針對客戶自行維修情形，HP 將負責所有運費及零件還換費用並指定使用何家快遞/貨運公司。

如需 HP 的「客戶自行維修」方案詳細資訊，請盡速洽您當地的服務供應商。至北美方案，請參閱 HP 網站 (http://www.hp.com/go/selfrepair)。
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CSR 부품은 제조 상태와 지리적 조건이 허용하는 경우 다음 영업일 날부터는 가능하도록 배송이 이루어집니다. 지리적 조건이 허용하는 경우 추가 비용이 청구되는 조건으로 당일 또는 4시간 배송이 가능할 수도 있습니다. 도움이 필요하시면 HP 기술 지원센터로 전화하십시오. 전문 기술자가 전화로 도움을 줄 것입니다. HP는 결함이 발생한 부품을 HP로 반환해야 하는지 여부를 CSR 교체 부품과 함께 배송된 자료에 명시합니다. 결함이 발생한 부품을 HP로 반환해야 하는 경우에는 저장된 기간 내(통상 영업일 기준 5일)에 HP로 반환해야 합니다. 이 때 결함이 발생한 부품은 제공된 포장 재료에 넣어 관련 설명서와 함께 반환해야 합니다. 결함이 발생한 부품을 반환하지 않는 경우 HP가 교체 부품에 대해 비용을 청구할 수 있습니다. 고객 셀프 수리의 경우, HP는 모든 운송 및 부품 반환 비용을 부담하며 이동할 운송업체 및 일반 서비스를 결정합니다.

Acronyms and abbreviations

**ABEND**
abnormal end

**ACU**
Array Configuration Utility

**AMP**
Advanced Memory Protection

**ASR**
Automatic Server Recovery

**BBWC**
battery-backed write cache

**CSA**
Canadian Standards Association

**DDDC**
Double Device Data Correction

**ESD**
electrostatic discharge

**FBWC**
flash-backed write cache

**IEC**
International Electrotechnical Commission

**iLO 4**
Integrated Lights-Out 4

**IML**
Integrated Management Log
KVM
keyboard, video, and mouse

NVRAM
nonvolatile memory

ORCA
Option ROM Configuration for Arrays

PCIe
Peripheral Component Interconnect Express

PCI-X
peripheral component interconnect extended

PDU
power distribution unit

PID
port ID

POST
Power-On Self Test

QPI
QuickPath Interconnect

RAS
Reliability, Availability, Serviceability

RBSU
ROM-Based Setup Utility

SAS
serial attached SCSI

SD
Secure Digital

SDDC
Single Device Data Correction
SFF
small form factor

SIM
Systems Insight Manager

SMI
Scalable memory interfaces

SPI
system peripheral interface

SPP
HP Service Pack for ProLiant

TMRA
recommended ambient operating temperature

TPM
Trusted Platform Module

UEFI
Unified Extensible Firmware Interface

UID
unit identification

UPS
uninterruptible power system

USB
universal serial bus

VCA
Version Control Agent
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