# HP StoreOnce D2D Backup System maintenance and service guide Addendum for Gen2E models


## Abstract

This guide is intended for users who maintain the following **Gen2E** rack-mounted models of the HP StoreOnce D2D Backup System:

- EH983B, HP D2D4312 (12–disk)
- EH993C, HP D2D4112 (12–disk)
- EH996B, HP D2D4106i (12–disk)
- EH998B, HP D2D4106fc (12–disk)
- EJ001C, HP D2D2502 (4–disk)
- EJ002C, HP D2D2504 (4–disk)

**NOTE:** There is no Gen2E version of the HP D2D4324 Backup System (EH985A).

The architecture of these StoreOnce D2D Backup Systems is based upon established HP ProLiant and HP Smart Array RAID controller products, which have their own user and service and maintenance guides. This document provides information on only those aspects that are not covered in the existing guides.

Please note earlier Gen2 products are described in the separate *Gen2 and Gen1 Backup Systems Maintenance and Service guide*.



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# 1 Introduction

This addendum to the Maintenance and Service Guide applies **only** to the following **Gen2e** rack-mounted models of the HP StoreOnce Backup System:

- EH983B, HP D2D4312 (12–disk)
- EH993C, HP D2D4112 (12–disk)
- EH996B, HP D2D4106i (12–disk)
- EH998B, HP D2D4106fc (12–disk)
- EJ001C, HP D2D2502 (4–disk)
- EJ002C, HP D2D2504 (4–disk)

**NOTE:** There is no Gen2E model of EH985A, HP D2D4324, and it is not included in this guide. For information about the HP D2D4324 Backup System, please refer to the original *HP StoreOnce Maintenance and Service Guide for Gen2 and Gen 1 products*.

The hardware for the HP D2D4324, the HP D2D4312/4112 and the HP D2D4106 Capacity Upgrade Kits is not described in this guide. Further information about these kits can be found in the *Installation Instructions* supplied with the kit.

## Performance best practices

HP recommends that you review the Best Practices for Perfomance Optimization White Paper, describing simple steps that can be performed to ensure that your HP D2D Backup System is optimized as efficiently as possible.

You can view this white paper from http://www.hp.com/support/manuals. Search for "D2D" and your specific product. The white papers are shown under the 'White paper' section.

## HP D2D and HP ProLiant

The information in the appropriate ProLiant Maintenance and Service Guide should be the primary reference source for hardware issues on the related D2D Backup System. Spare part numbers are available in the ProLiant guides. This guide contains only information that is not included in the ProLiant documentation.

**Table 1 Identifying the correct server guide for Gen2E products**

| HP D2D Backup System | Product number | HP ProLiant server |
|---|---|---|
| HP D2D4312 G2 Backup System | EH983B | HP ProLiant DL370 G6 server |
| HP D2D4106i/4106fc/4112 G2 Backup System | EH996B/EH998B/EH993C | HP ProLiant DL180se G6 server |
| HP D2D2502/2504 G2 Backup System | EJ001C/EJ002C | HP ProLiant DL160se G6 server |

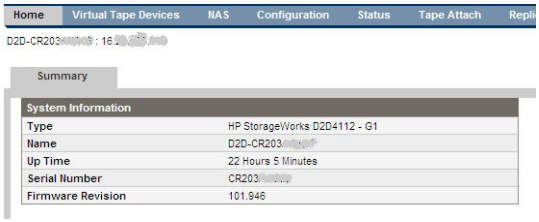
**NOTE:** The software and, in some cases, the BIOS are unique to the HP D2D Backup System; it does not use the same software (nor, in some cases, BIOS) as the ProLiant server.

There are a number of ways of accessing the ProLiant documentation on the HP web. A quick method is to:

1. Go to http://www.hp.com/support/manuals.
2. Search on the ProLiant server name, as shown in Table 1.

## How do I tell whether I have a Gen2E product?

The Summary Page of the Web Management Interface will tell you the **Type** of product.




The product model number also identifies whether it is a Gen2E product, see Table 1 above. This number can be found on the product label (you may need to remove the product from the rack to locate the label).

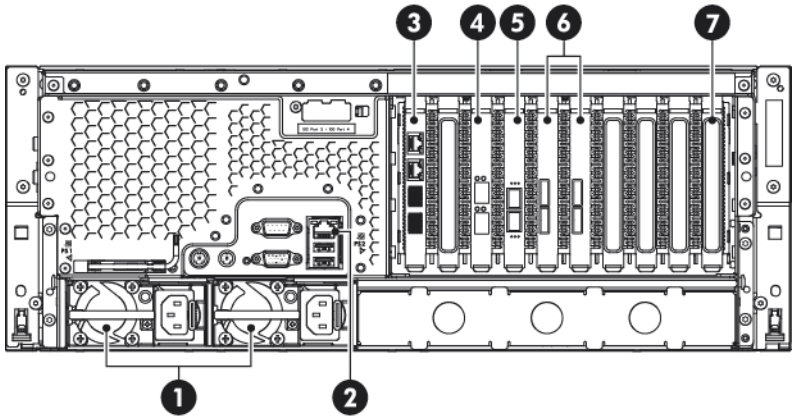
## Using the ProLiant Guide with HP D2D4312, EH983B, models

When using the HP ProLiant DL370 G6 guide, be aware of the following HP D2D-specific information:

- The CPU is Intel Xeon W5690 (Kit part number 625071-B21 includes Heatsink) – there are two per system.
- The HP D2D has 12 removable hard disks. The 12th disk is an online spare disk. If one of the other disks fails, the online spare disk immediately takes its place.
- The system comes with three RAID controller cards — the HP Smart Array P410i (integrated into the Motherboard and with FBWC) and two HP Smart Array P411 cards (each with a 512MB FBWC module). The P411 cards are installed in PCI-e Slots 5 and 6. Part numbers for the P411 card are as follows:
  - HP Smart Array P411/512 MB with FBWC Controller: 578229-B21
  - HP 512 MB Flash Backed Write Cache (FBWC): 534916–B21

  For more information about the HP Smart Array cards, search on http://www.hp.com/support/manuals.
- The configuration of the system memory is 96 GB (12 x 8 GB DIMMs, 6 per processor). The part number for each 8 GB DIMM is 500662-B21.
- The system has an HP 8Gb Dual Channel PCI-e to Fibre Channel Host Bus Adapter, part number AJ764A.
- The system has an HP NC522SFP Dual Port 10GbE Server Adapter, part number 614202-B21.
- The system has an HP SAS Expander Card, part number 468406-B21, in PCI-e Slot 1.

**Figure 1 Rear view of the HP D2D4312**



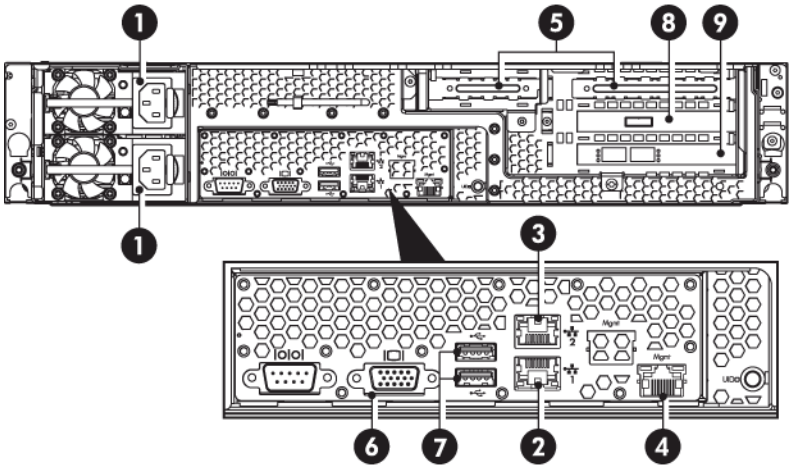

1. Power supplies (two)
2. iLO2 Management port (do not use for data)
3. LAN ports 3 (required connection) and 4
4. 10–Gb Ethernet card with two ports
5. Fibre Channel card
6. RAID cards
7. HP SAS expander card

## Using the ProLiant Guide with HP D2D4106/4112, EH996B/EH998B/EH993C, models

When using the HP ProLiant DL180se G6 guide, be aware of the following HP D2D-specific information:

- The CPU is Intel Xeon X5550 (Spare P/N 490070-001) – there are two per system
- The HP D2D has 12 removable hard disks. The 12th disk is an online spare disk. If one of the other disks fails, the online spare disk immediately takes its place. (The HP D2D4106 has 12 x 500 GB hard disks; the HP D2D4112 has 12 x 1 TB hard disks.)
- The configuration of the system memory is 72 GB (9 x 8 GB DIMMs; 5 for the first processor, 4 for the second). The part number for each 8 GB DIMM is 500662-B21.
- The HP D2D is supplied with an HP Smart Array P212/Zero Memory Controller (with 512 MB FBWC module) pre-installed in one of the full-height PCI-e slots. For more information about this card, search on http://www.hp.com/support/manuals. Part numbers are as follows:
  - HP Smart Array P212/Zero Memory Controller: 462828–B21
  - HP 512 MB Flash Backed Write Cache (FBWC): 534916–B21
- The system has an HP Dual Channel 8Gb PCIe toFibre Channel Host Bus Adapter, part number AJ764A, which is installed in a full-height slot

**Figure 2 Rear view of the HP D2D4106/4112**




1. Power supply cable sockets (two)
2. LAN port 1 (always used for data connection)
3. LAN port 2
4. Management LAN port (Do **not** use for data)
5. PCI-e slots
6. VGA port for system console monitor
7. USB ports for system console keyboard and mouse
8. RAID controller
9. Fibre Channel card (HP D2D4106fc/4112)

## Using the ProLiant Guide with HP D2D2502/2504, EJ001C/EJ002C, models

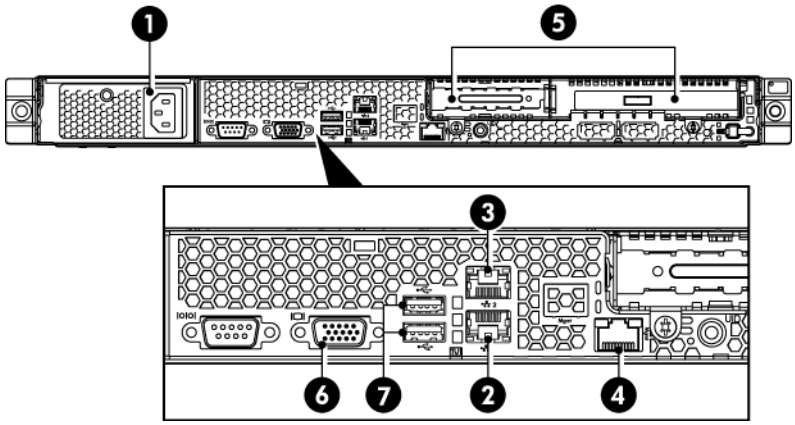
When using the HP ProLiant DL160se G6 guide, be aware of the following HP D2D-specific information:

- The CPU is the Intel Xeon E5520, part number 506013-001. There is one per system.
- The HP D2D has four removable hard disks.
- There is no optical media storage.
- HP D2D2502 Backup System: The configuration of the system memory is 24 GB (3 x 8 GB DIMMs) for the HP D2D2502 Backup System.

  HP D2D2504 Backup System: The configuration of the system memory is 32 GB (4 x 8 GB DIMMs).

  The part number for each 8 GB DIMM is 500662-B21.
- The HP D2D is supplied with an HP Smart Array P212 RAID controller (with 512 MB FBWC module) pre-installed in one of the full-height PCI-e slots. For more information about this card, search on http://www.hp.com/support/manuals. Part numbers are as follows:
  - HP Smart Array P212/Zero Memory Controller: 462828–B21
  - HP 512 MB Flash Backed Write Cache (FBWC): 534916-B21

**Figure 3 Rear view of the HP D2D2502/2504**




1. Power supply cable socket
2. LAN port 1 (always used for data connection)
3. LAN port 2
4. iLO2 Management port (Do **not** use for data)
5. PCIe slots (one full and one low profile)
6. VGA port for system console monitor
7. USB ports for system console keyboard and mouse

## POST messages and troubleshooting

The HP D2D Web Management Interface is the primary source of troubleshooting information. However, it is not able to capture power-on self-test hardware-related issues. Always refer to the appropriate Maintenance and Service Guide for Power-On Self-Test (POST) information. To view POST messages you will need a system console attached to the HP D2D. Please see the HP D2D Backup System User Guide for more information about connecting and using the system console.

## Tasks that are unique to the HP D2D

The following tasks are described in this guide:

- How to replace the flash memory module
- How to replace the motherboard
- How to replace the HP Smart Array RAID controller

## Software upgrades

The Web Management Interface is used to upgrade software and also has a link to the HP Support website from where the software must be downloaded. Language Pack upgrades are also available to ensure all updates to screen messages and help text are displayed correctly in all languages. For more information about the upgrade process and how to use the Web Management Interface, please refer to the Software (Administration) section of the Web Management Interface chapter in the *HP D2D Backup System User Guide*. See also Related documentation (page 26).

# 2 The flash memory module

## Overview

The flash memory module is required to boot up the HP D2D Backup System.

- With HP D2D4312 Backup Systems, this consists of a USB flash stick that plugs into the system board.
- With all other HP D2D Backup Systems, this consists of a USB flash stick and cable.
- There are different memory sticks for G2 and G1 products. Make sure you are using the correct one.

### Part number

Each software revision has its own part number. Please refer to http://www.hp.com or contact HP Support to find out which part number is required.

## Identifying a flash memory module failure

Symptoms of problems with the memory module are:

- The system hangs
- Hosts cannot connect to the HP D2D Backup System via the Web Management Interface

### Troubleshooting procedure

1. If it is not already connected, connect the system console to the HP D2D Backup System.
2. Power cycle the HP D2D Backup System.
3. The HP D2D will attempt to boot from the flash memory module. The flash memory module is at fault, if the reboot fails with the following message: "Cannot find any bootable media" or if the system fails to boot completely or if it attempts to PXE boot.
4. Power off the system, remove the cover and check the cabling on the flash memory module. If this does not remedy the problem, replace the flash memory module.

## Replacing the memory module

**NOTE:** The memory module for the HP D2D4312 model consists of a USB flash stick. The memory module for the other Gen2e models consists of a flash stick with cable. It is normally sufficient to replace only the USB stick, leaving the existing cable in place.

1. Power off the system and remove the cover from the HP D2D, as described in the appropriate HP ProLiant Maintenance and Service guide. Locate the memory module (labeled **1** on the diagrams below).
2. Pull the failed memory module out of the USB connector (**1**) and simply plug in the replacement module.
3. **HP D2D4112/4106 and HP D2D2502/2504 models only:** If you need to replace the cable as well, first unscrew the bracket (**2**) holding the USB connector and then disconnect the cable from the motherboard (**3**). Replace the whole cable and tighten the screw on the bracket. Make sure both ends of the cable are connected securely.

   **NOTE:** The memory module for the HP D2D4312 model does not have a cable.

4. Be sure to update the HP D2D software to the latest version. This is done from the Web Management Interface (Settings/Software page), as described in the *HP StoreOnce D2D Backup System User Guide*.

**IMPORTANT:** If your replacement flash stick is at a lower revision than the one it replaces, you may experience a message of “Devices Starting” or “Initialising". This message will also occur, if the D2D Backup System did not shutdown correctly. In this case, please wait a minimum of 12 hours before updating software.

**Figure 4 HP D2D4312 flash memory module**

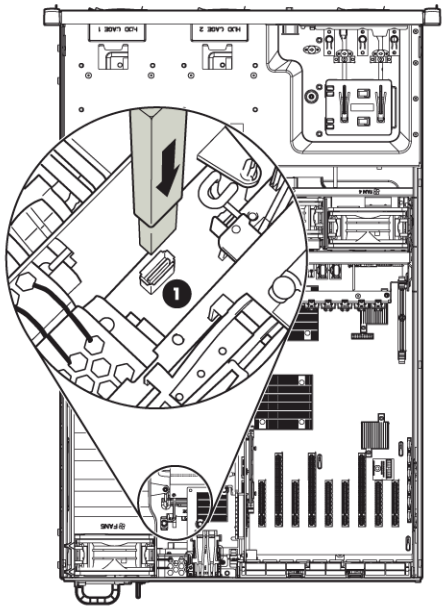
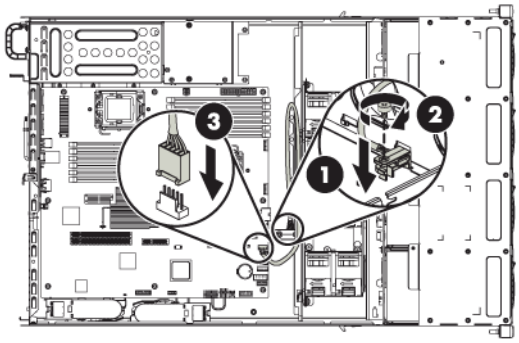
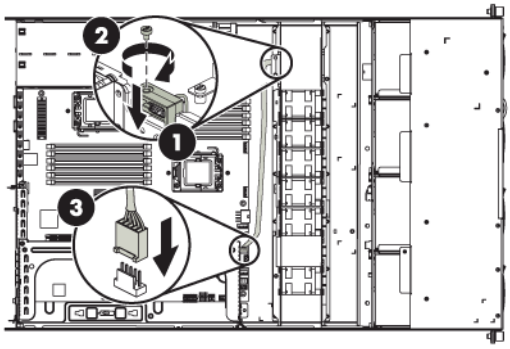



**Figure 5 HP D2D4106 or HP D2D4112 flash memory module**



### Figure 6 HP D2D2502 and HP D2D2504 flash memory module




**1** location of the memory module and USB connector

**2** screw and bracket securing USB cable connector (not HP D2D4312)

**3** cable and connector to the motherboard (not HP D2D4312)

# 3 Replacing the system motherboard

For all products, refer to the appropriate Maintenance and Server Guide for detailed instructions on replacing the motherboard. This chapter describes the following tasks that are specific to HP D2D Backup Systems:

- Set the J27 jumper on HP D2D4106/4112 and HP D2D2502/2504 products.
- Update BIOS IDs on all products.
- Reinstate iLO2 licences on all products
- Reinstate the RAID 6 license for the integral RAID controller on HP D2D4312 products

**IMPORTANT:** When replacing the motherboard (or individual cards) be sure to always replace cards into the same slot from which they were removed. See also the rear view drawings in Chapter 1.

## Motherboard part numbers

- HP D2D4312 G2 Backup Systems: The motherboard for the HP D2D4312 Backup System is the standard DL370 G6 motherboard. Please refer to the *DL370 G6 Maintenance and Service Guide* for details of how to replace it.

**IMPORTANT:** Please ensure that the system maintenance switch SW1, S3 setting is set to ON - to ensure that the motherboard is seen as a DL370 and not an ML370.

- HP D2D4106/4112 G2 and HP D2D2502/2504 G2 Backup Systems: The motherboard for both the HP D2D4106/4112 Backup System and the HP D2D2502/2504 Backup System is part number: 583724-001.

## Before replacing the motherboard— a note about licenses

### iLO2 licenses

All G2 products are shipped with paper copies of the iLO2 licenses. If you no longer have these licenses and the board is still working for the iLO2 GUI connection via its management Ethernet port, make a note of the license before you remove the motherboard. (If it is not working, contact HP Support.)

1. Log on to the iLO2 GUI.
2. Select the **Administration** Tab.
3. Select **Licensing** and make a note of the License Key.

### SAAP licence (HP D2D4312)

The Smart Array Advanced Pack (SAAP) is required to enable RAID 6 support. You must reinstate the SAAP license, if you replace the motherboard on an HP D2D4312 product, because it has an integral P410i card. If you do not, the system will experience one of the following symptoms :

- Very slow product performance (Running as RAID5 access to the disks, if the arrays had not failed themselves)
- Refusal to create the storage (if the storage arrays have failed and need to be rebuilt from scratch)

The units are shipped with paper copies of the SAAP license. If you no longer have this license and the board is still working, make a note of the license before you replace the motherboard.

1. Reboot the system.
2. During the POST screen, when advised, hit any key to see further messages.

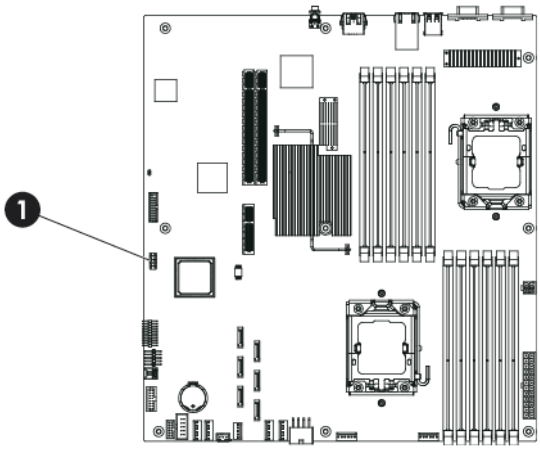
3. Enter the Smart Array POST ORCA utility by pressing [F8] when advised during the POST messages.
4. Select the Manage Licenses option in the Smart Array menu, and then select View Licenses.
5. Make a note of the licence key reported. This key is unique to the system and can be used for any replacement Smart Array card (or HP D2D4312 motherboard).

# J27 settings (HP D2D4106/4112 and HP D2D2502/2504)

**NOTE:** This section is not relevant for HP D2D4312 models.

The following diagram shows the location of the J27 jumper on the motherboard.

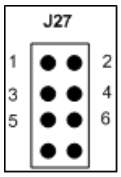
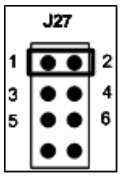
**Figure 7 Location of the J27 jumper**




**1** J27 jumper

When replacing the motherboard on HP D2D4106/4112 models or on HP D2D2502/2504 models, set the jumper as follows.

**Table 2 J27 jumper settings**

| D2D Backup System | |
|---|---|
| HP D2D4106/4112:<br>Remove all jumpers |  |
| HP D2D2502/2504:<br>Jumper should be set on pins 1 and 2 |  |

# After replacing the motherboard

For all Gen2e products you must:

1. Install the latest BIOS revision from the relevant product site. All BIOS revisions can be found at http://www.hp.com/support/downloads (under Storage — Disk Storage Systems — Disk to disk Backup — HP D2D Backup Systems).
2. Reboot the system. During the system BIOS boot process, when the prompt to Press F9 is visible, press the F9 key to enter the RBSU (ROM-based Setup Utility) or BIOS Setup. This is so that you can change.
3. Change the Performance options, as shown in the following table.

**NOTE:** Unless noted otherwise, the settings apply to all Gen2e products.

**Table 3 RBSU settings**

| RBSU setting | Sub-setting | Sub-sub-setting | Current | Change to... |
|---|---|---|---|---|
| Advanced Options | Advanced Performance Tuning Options | Memory Speed with 2 DIMMs per Channel | 1066 MHz Maximum | **1333 MHz Maximum** |
| | Service Options | Product Id (ignore warning displayed) | M/B default | Appropriate Product ID for G2 shown in table below |
| Advanced Options (HP D2D4312 only) | Thermal Configuration | | Optimal Cooling | **Increased Cooling** |
| Power Management Options | HP Power Profile | | Balanced Power and Performance | **Maximum Performance** |
| | HP Power Regulator | | HP Dynamic Power Savings Mode | **HP Static High Performance Mode** |

4. Change the BIOS ID, as shown in the following table.

**Table 4 BIOS IDs for Gen2e products**

| Model | BIOS ID number |
|---|---|
| D2D2502i | 678056–B21 |
| D2D2504i | 678057–B21 |
| D2D4106i | 678058–B21 |
| D2D4106fc | 678059–B21 |
| D2D4112 | 678060–B21 |
| D2D4312 | 678061–B21 |

5. Exit RBSU and add the iLO2 license.
   a. Log on to the iLO2 GUI.
   b. Select the **Administration** Tab.
   c. Select **Licensing** and enter the recorded licence key in the section marked **Enter License Activation Key**.
6. HP D2D4312 only: Add the SAAP license for the integral P410i RAID card.
   a. Reboot the system.
   b. During the POST screen, when advised, hit any key to see further messages.
   c. Enter the Smart Array POST ORCA utility by pressing [F8] when advised during the POST messages.
   d. Select the **Manage Licenses** option in the Smart Array menu, and then select **Install Licenses**.
   e. Enter the licence key previously noted.

# 4 Flash Backed Write Cache (FBWC) module failures

## Part numbers

The part number for a replacement FBWC module is: 534916-B21

If replacing this module does not resolve the problem, it may be necessary to replace the RAID controller card. See the appropriate chapter for your RAID card for more information about replacement procedures and part numbers.

## Identifying the battery/flash capacitor module failure

Module failures are reported in the Log and, if you have email alerts set up, you will be notified of any failure. The following example illustrates an alert for a failed RAID battery:

```
**********************************************************************************
This is a system generated message from your HP StoreOnce D2D Backup System
Email Notification From AB4032
6-Jun-2008 8:08:15 : The RAID battery backup has failed
For further information please browse to
     https://AB4032.exxx.hpqcorp.net (https://nn.nn.9.92)
Please do not reply to this email.
**********************************************************************************
```

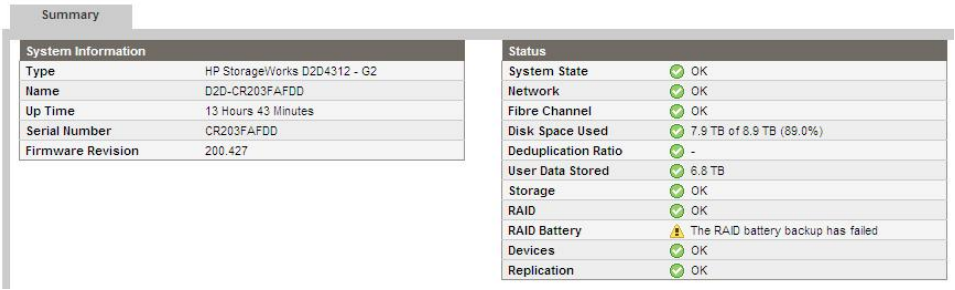
## HP D2D4312, D2D4106 and D2D4112

The status of the cache module is also reported on the Summary and Storage-RAID pages of the Web Management Interface.

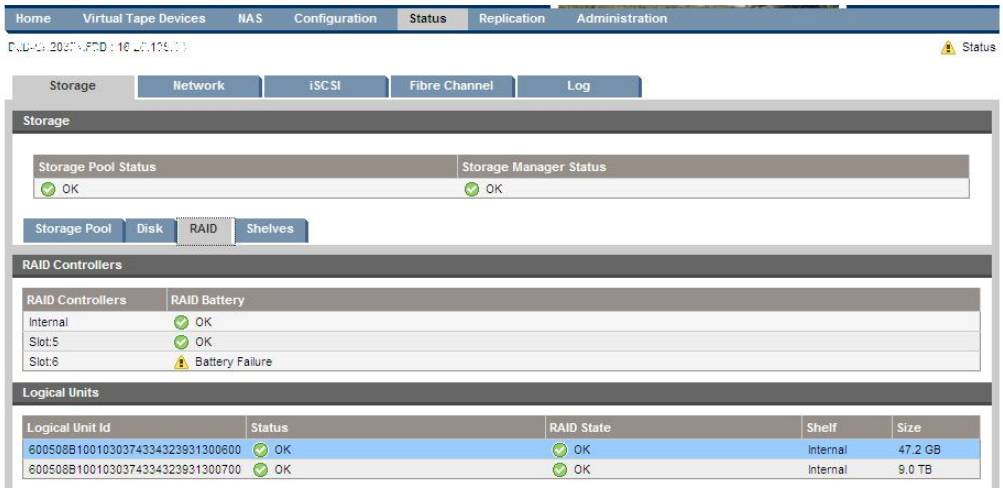
The HP D2D4112 and the HP D2D4106 have one battery only.

The HP D2D4312 has three flash capacitor modules; one for each RAID card. The Summary page shows that there is a flash capacitor module, but does not identify the card to which it belongs. Look at the Storage-RAID page to identify the card. The P410i card is identified as internal; the two P411 (HP D2D4312) cards are identified by their slot location.

**Figure 8 Example HP D2D4312 Summary page showing battery failure**



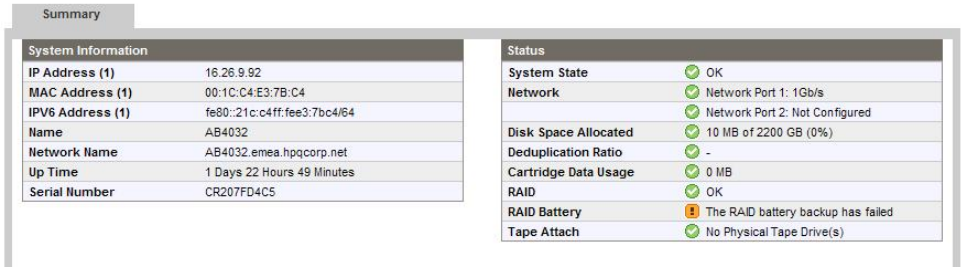
### Figure 9 Example HP D2D4312 Storage—RAID page showing battery failure



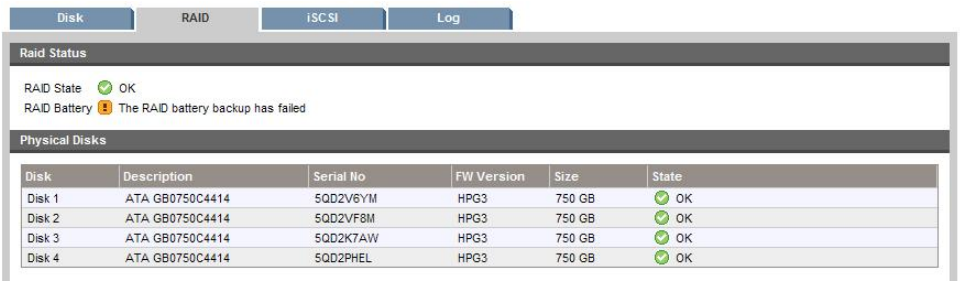

## HP D2D2502/4

The status of the battery is reported on the Summary and Status-RAID pages of the Web Management Interface.

### Figure 10 Summary page showing a failed RAID battery




### Figure 11 RAID page showing a failed RAID battery (HP D2D2502/2504)

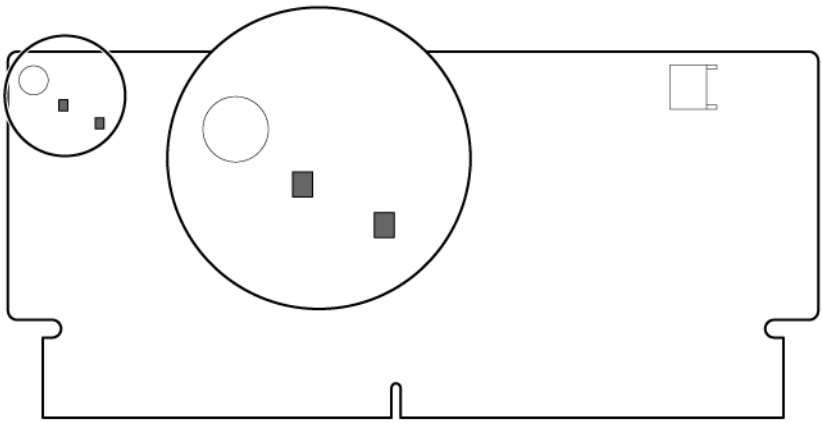



# Replacing the battery/flash capacitor module

## Flash capacitor module location

There is one FBWC (flash backed write cache) module for each Smart Array Controller. Each FBWC has a capacitor pack to ensure cache contents are maintained after a loss of power. Each Smart Array RAID controller has an integral capacitor pack, whilst the P410i controller's capacitor pack is located in the holder in the centre of the HP D2D4312 Backup System. Each FBWC module has two single-color LEDs (green and amber). The LEDs are duplicated on the reverse side of the cache module to facilitate status viewing. See the *HP Smart Array Controllers for HP ProLiant Servers User Guide* for more information.

**Figure 12 FBWC module LEDs**



## Procedure

1. Remove the cover from the HP D2D Backup System, as described in the appropriate HP ProLiant Maintenance and Service guide, and locate the FBWC (see previous section).
2. Look at the LEDs on the FBWC. If the LEDs are blinking amber they module should be replaced.

   **NOTE:** For a detailed description of the LEDs, refer to the "HP Smart Arrays for HP ProLiant Servers user guide".

3. Follow the instructions in the "HP Smart Arrays for HP ProLiant Servers user guide" to remove and dispose of the old FBWC and to replace it with the new one.
4. Replace the cover and power up the HP D2D. Check the status of the battery on the Summary page. If the system does not power up, the associated RAID card may need replacing.

# 5 The HP SmartArray P410i and P411 RAID controllers and HP SAS expander card (HP D2D4312)

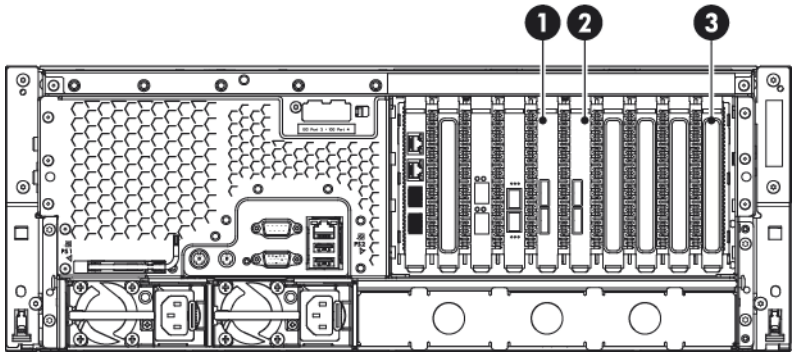
## Overview

The HP D2D4312 has three RAID controllers.

- The P410i RAID controller is integral to the DL370G6 motherboard and is used to control the 12 hard disk drives internal to the HP D2D4312 via the HP SAS Expander card in slot 1.
- The two P411 cards are used to connect the external storage shelves to the D2D 4312 and are located in PCI-e slots 5 and 6.
- Each P410i and P411 RAID controller is fitted with 512 MB RAM and one 512 MB FBWC (Flash Backed Write Cache).

**NOTE:** If you replace a motherboard with integral P410i card, or a P411 card, you must add the RAID 6 license for the card, as described in the relevant sections below.

**Figure 13 HP D2D4312, location of the P411 controller and HP SAS expander card**




**1 and 2** P411 RAID controllers

**3** HP SAS expander card

⚠ **WARNING!** To reduce the risk of personal injury or damage to the equipment, consult the safety information and user documentation provided with the server and RAID controllers before attempting the installation.

## Part numbers

Part numbers for the replacement RAID controllers are as follows:

- The P410i card is integral to the motherboard and cannot be replaced separately.
- HP D2D4312: HP Smart Array P411/512 MB with FBWC Controller: 578229-B21

## Identifying a RAID contoller failure

RAID card failures are reported in the Log and in email alerts, if you have set them up. For example: `cache module failure`.

You can identify which card has failed by looking at the Storage-RAID pages of the Web Management Interface. The P410i card is identified as “internal”; the P411 cards are identified by their slot number in the Controllers section. Any issues with logical units on this page also indicate a problem.

If the HP SAS expander card is at fault, disks will not be visible on the Storage-Shelves tab

**NOTE:** If RAID fails and the HP D2D Backup System is still functioning, you can also get information, including license keys, by generating a Support ticket (from the Administration-Support web page).

## Before replacing a RAID controller — a note about licenses

The Smart Array Advanced Pack (SAAP) is required to enable RAID 6 support. You must reinstate the SAAP license, if you replace the motherboard/P410i on the HP D2D4312 products or if you replace one of the P411 cards on an HP D2D4312 product.

If you do not reinstate the license, the system will experience one of the following symptoms :

- Very slow product performance (Running as RAID 5 access to the disks, if the arrays had not failed themselves)
- Refusal to create the storage (if the storage arrays have failed and need to be rebuilt from scratch)

**NOTE:** It is not necessary to reinstate the license with the P812 card.

The units are shipped with paper copies of the SAAP license. If you no longer have this license and the board is still working, make a note of the license before you replace the motherboard. If it is not working, contact HP Support.

1. Reboot the system.
2. During the POST screen, when advised, hit any key to see further messages.
3. Enter the Smart Array POST ORCA utility by pressing [F8] when advised during the POST messages.
4. Select the Manage Licenses option in the Smart Array menu, and then select View Licenses.
5. Make a note of the licence key reported. This key is unique to the system and can be used for any replacement Smart Array card (or HP D2D4312 motherboard).

## P410i controller failure (HP D2D4312)

If the P410i card fails, you must replace the motherboard.

**IMPORTANT:** When replacing the motherboard/P410i controller be sure to always replace cards into the same slot from which they were removed. See also the rear view drawings in Chapter 1. Make sure the card is connected to its cache module. (Follow the cables back to identify to which card each battery is connected.)

Replace the P410i card as described in the appropriate Maintenance and Service guide and then reinstate the SAAP license.

1. Reboot the system.
2. During the POST screen, when advised, hit any key to see further messages.
3. Enter the Smart Array POST ORCA utility by pressing [F8] when details for the P410i card are displayed.
4. Select the **Manage Licenses** option in the Smart Array menu, and then select **Install Licenses**.
5. Enter the licence key previously noted.

## P411 controller failure (HP D2D4312)

**IMPORTANT:** When replacing the P411 controller be sure to always replace cards into the same slot from which they were removed. See also the rear view drawings in Chapter 1. Make sure the card is connected to the BBWC. (Follow the cables back to identify to which card each battery is connected.)

1. Power off the HP D2D Backup System. Remove the cover from the HP D2D, as described in the appropriate HP ProLiant Maintenance and Service guide, and locate the P411 controllers in PCI-e slots 5 and 6.

   **NOTE:** The LEDs on the P411 controller card provide diagnostic information when the unit is powered on. For a detailed description of these LEDs, refer to the "HP Smart Arrays for HP ProLiant Servers user guide".

2. Unclip the blue PCIe card retaining latch and remove the PCIe card.
3. Install the new P411 card and check that it is seated properly. Close the blue PCIe card retaining latch.
4. Replace the cover, as described in the appropriate HP ProLiant Maintenance and Service guide, and power on the HP D2D Backup System.
5. Install the SAAP license.
   a. Reboot the system.
   b. During the POST screen, when advised, hit any key to see further messages.
   c. Enter the Smart Array POST ORCA utility by pressing [F8] when details for the P411 card are displayed during the POST messages.
   d. Select the **Manage Licenses** option in the Smart Array menu, and then select **Install Licenses**.
   e. Enter the licence key previously noted.

## HP SAS expander card (HP D2D4312)

If no disks are showing on the Storage-Shelves page of the D2D Web Management Interface, there may be a problem with the HP SAS expander card.

The part number for a replacement card is: 468405–001. It must be installed in PCI-e slot 1.

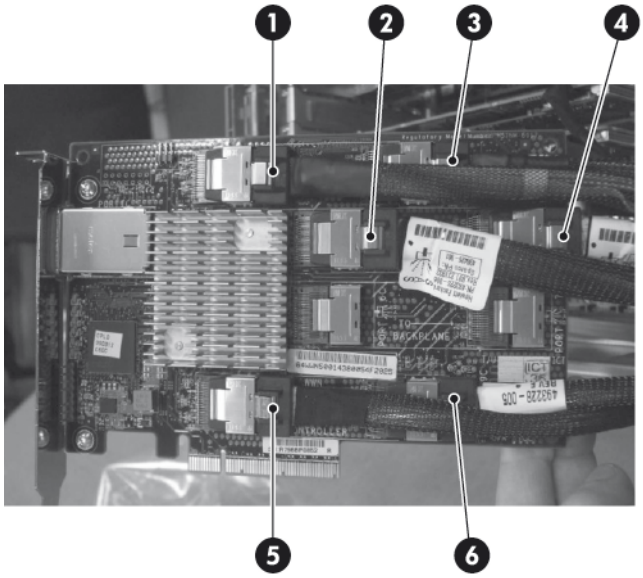
Mini-SAS cables (part numbers 493228–005 and 493228–006) connect the expander card to the hard disk drive backplane, as described in the following table. SAS cables are also connected from the motherboard to the SAS expander card

**NOTE:** Tuck the mini-SAS cables to be routed to the backplane into the side of the chassis. Loop the SAS cables to connect to the motherboard in the void.

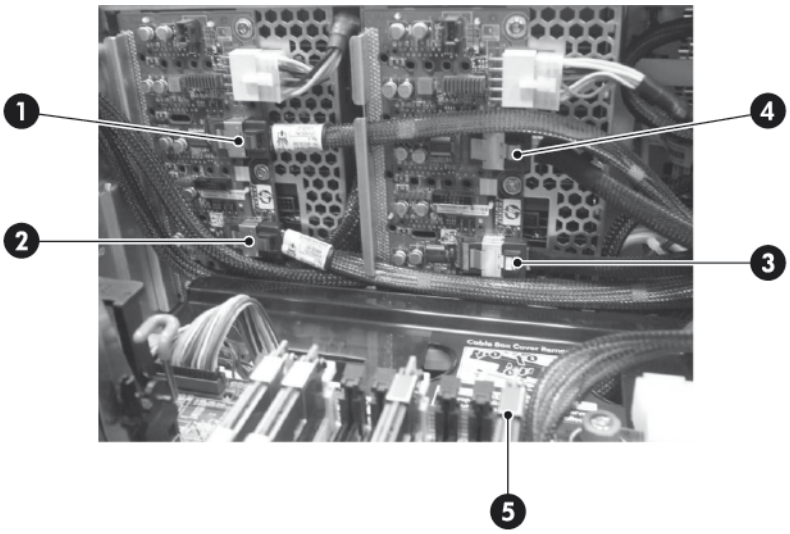
**Table 5 Cabling to HP SAS expander card (HP D2D4312)**

| | Connect | From. | To |
|---|---|---|---|
| **1** | 493228–006 mini-SAS cable | Port 2C on SAS expander card | Bottom right HDD backplane connector |
| **2** | 493228–006 mini-SAS cable | Port 3C on SAS expander card | Top right HDD backplane connector |
| **3** | 493228–005 mini-SAS cable | Port 4C on SAS expander card | Bottom left HDD backplane connector |
| **4** | 493228–005 mini-SAS cable | Port 5C on SAS expander card | Top left HDD backplane connector |
| **5** | SAS cable | Connector A (left) on the motherboard | Port 8C on the SAS expander card |
| **6** | SAS cable | Connector B (right) on the motherboard | Port 9C on the SAS expander card |

## Figure 14 Cabling showing the SAS expander card




## Figure 15 Cabling showing the backplanes



# 6 The HP SmartArray P212 RAID controller (HP D2D2502, 2504, 4106, 4112)

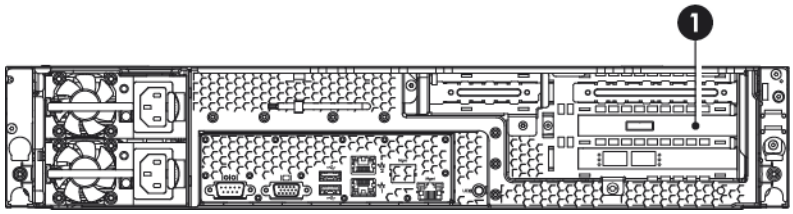
## Overview

The following Gen2e HP D2D Backup Systems use the HP SmartArray P212 RAID controller fitted with a 512 MB FBWC (flash backed write cache) module.

- HP D2D2502, EJ001C
- HP D2D2504, EJ002C
- HP D2D4106i, EH996B
- HP D2D4106fc, EH998B
- HP D2D4112, EH983B

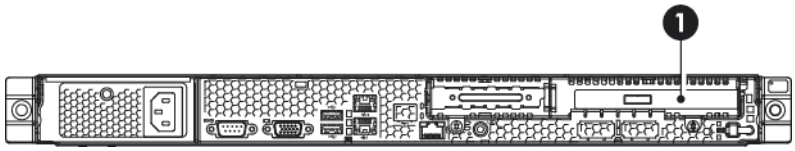
**NOTE:** If you replace a P212 card in an HP D2D4106/4112, you must also add the RAID 6 license for the new card, as described in the relevant sections below.

**Figure 16 HP D2D4106/4112 models, location of the P212 controller**




**1** RAID controller

**Figure 17 HP D2D2502/2504 models, location of the P212 controller**




**1** RAID controller

⚠ **WARNING!** To reduce the risk of personal injury or damage to the equipment, consult the safety information and user documentation provided with the server and P212 controller before attempting the installation.

## Part numbers

The required parts are:

- HP Smart Array P212/Zero Memory Controller, part number 462828-B21
- HP 512 MB Flash Backed Write Cache (FBWC), part number 534916-B21

# Identifying a RAID contoller failure

**NOTE:** There are eight LEDs on the P212 controller card that provide diagnostic information when the unit is powered on. For a detailed description of these LEDs, refer to the “HP Smart Arrays for HP ProLiant Servers user guide”.

P212 card failures are likely to occur only during power down or power up. Failure means that the P212 card is unable to mount the RAID array. Status messages on the Web Management Interface will advise that:

- Summary page: `RAID catastrophically failed`
- Storage—RAID page (HP D2D4106/4112): `RAID device is not available`. Any issues with logical units on this page also indicate a problem.
- RAID page (HP D2D2502/2504): `RAID device is not available`

RAID card failures are also reported in the Log and in email alerts, if you have set them up. For example: `cache module failure`.

**NOTE:** If RAID fails and the HP D2D Backup System is still functioning, you can also get information, including license keys, by generating a Support ticket (from the Administration-Support web page).

## Before replacing a RAID controller — a note about licenses

**NOTE:** HP D2D2502/2504 G2 products do not require the SAAP license, since they operate in RAID 5 mode.

The Smart Array Advanced Pack (SAAP) is required to enable RAID 6 support. You must reinstate the SAAP license, if you replace the P212 cards on an HP D2D4106/4112 G2 product. If you do not, the system will experience one of the following symptoms :

- Very slow product performance (Running as RAID 5 access to the disks, if the arrays had not failed themselves)
- Refusal to create the storage (if the storage arrays have failed and need to be rebuilt from scratch)

The units are shipped with paper copies of the SAAP license. If you no longer have this license and the board is still working, make a note of the license before you replace the faulty SmartArray card. If it is not working, contact HP Support.

1. Reboot the system.
2. During the POST screen, when advised, hit any key to see further messages.
3. Enter the Smart Array POST ORCA utility by pressing [F8] when the details for the RAID controller are displayed during the POST messages.
4. Select the Manage Licenses option in the Smart Array menu, and then select View Licenses.
5. Make a note of the licence key reported. This key is unique to the system and can be used for any replacement Smart Array card.

## Replacing the HP Smart Array P212 controller

**IMPORTANT:** When replacing the P212 controller be sure to always replace the card into the same *full-height* slot from which it was removed. Make sure the card is connected to the BBWC.

1. Check first that the P212 controller is seated properly and the cable to the BBWC is secure.
2. Make sure the HP D2D is powered off and, observing the safety and antistatic procedures documented in the HP ProLiant and HP Smart Arrays for HP ProLiant Servers user guides, remove the cover and PCI cage from the HP D2D and disconnect the failed card from the cable. Replace it with the new card (**1**) and secure it to the bracket (**2**).

**Figure 18 Inserting a P212 card into an HP D2D4106/4112**

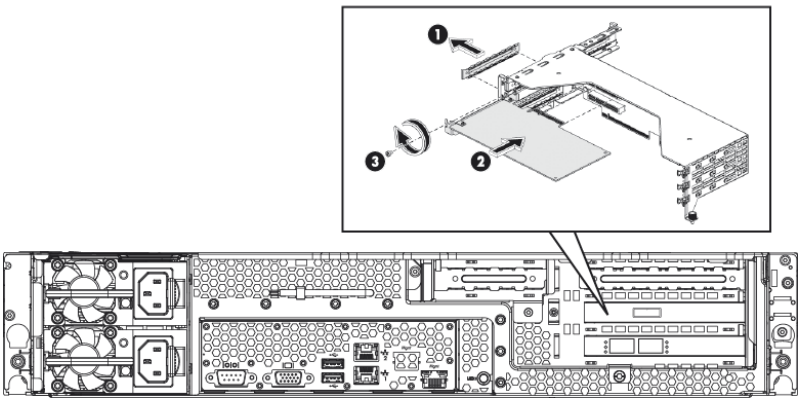
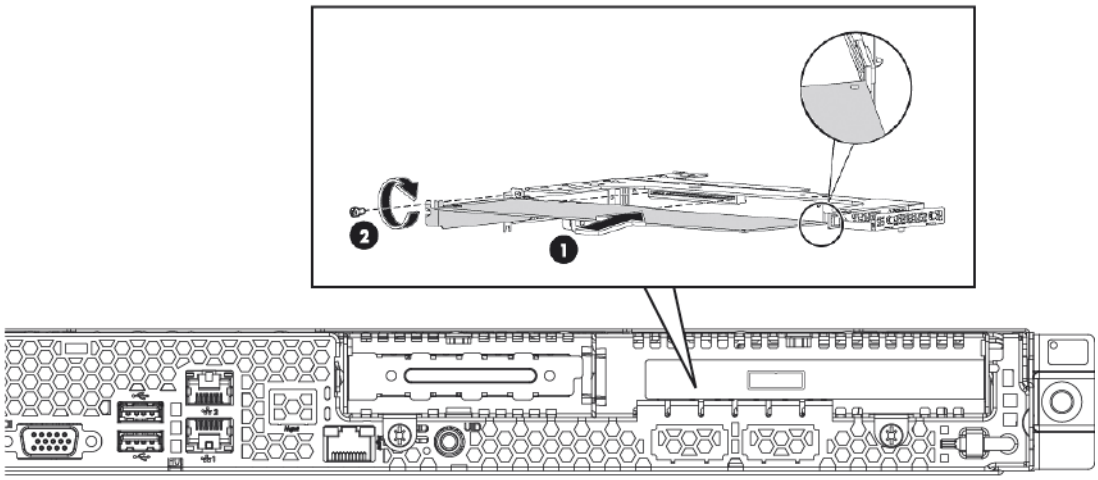


**Figure 19 Inserting a P212 card into an HP D2D2502/2504**



3. Reconnect the card to the existing BBWC cable. (If preferred, replace the BBWC cable with the one supplied with the replacement card.)
4. Check that the P212 controller is seated properly and the cable to the BBWC is secure.
5. Replace the PCI cage and cover, as described in the appropriate HP ProLiant Maintenance and Service guide, and power on the HP D2D Backup System.
6. **HP D2D4106/4112 Backup Systems only:** Reinstate the SAAP license.
   a. Reboot the system.
   b. During the POST screen, when advised, hit any key to see further messages.
   c. Enter the Smart Array POST ORCA utility by pressing [F8] when details for the P212 card are displayed during the POST messages.
   d. Select the **Manage Licenses** option in the Smart Array menu, and then select **Install Licenses**.
   e. Enter the licence key previously noted.

# Support and other resources

## Related documentation

In addition to this guide, the following documents provide related information:

- 'Start here' poster for an overview of the HP D2D (available in English, French, German and Japanese)
- HP D2D Backup System user guide
- HP D2D Backup System concepts guide
- HP D2D Backup System installation and configuration guide
- HP Smart Arrays for HP ProLiant user guide
- HP ProLiant DL370 G6 Maintenance and Service guides
- HP ProLiant DL180 G6 and DL160 G6 Maintenance and Service guides
- HP ProLiant DL185 G5 and DL165 G5 Maintenance and Service guides
- HP D2D4100 Series and D2D4300 Series Backup System Capacity Upgrade Kit Installation Instructions
- HP StoreOnce D2D Backup System Best Practices for Performance Optimization

You can find these documents from the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/manuals

In the Storage section, click **Storage Solutions** and then select your product.

## Document conventions and symbols

| Convention | Element |
|---|---|
| Blue text: ??? | Cross-reference links and e-mail addresses |
| Blue, underlined text: http://www.hp.com | Website addresses |
| **Bold** text | • Keys that are pressed<br>• Text typed into a GUI element, such as a box<br>• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes |
| *Italic* text | Text emphasis |
| `Monospace` text | • File and directory names<br>• System output<br>• Code<br>• Commands, their arguments, and argument values |

**WARNING!** Indicates that failure to follow directions could result in bodily harm or death.

**CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

**IMPORTANT:** Provides clarifying information or specific instructions.

**NOTE:** Provides additional information.

## HP technical support

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

## Customer self repair

HP customer self repair (CSR) programs allow you to repair your HP product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider, or see the CSR website:

http://www.hp.com/go/selfrepair

## Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/go/e-updates

After registering, you will receive e-mail notification of product enhancements, new driver versions, software updates, and other product resources.

## HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/go/connect
- http://www.hp.com/go/ebs
- http://www.hp.com/service_locator
- http://www.hp.com/support/manuals

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