Installation & Upgrade Instructions

VA 7000 Family

Array Controller, Filler Panel, Battery, & DIMM

This document provides instructions for installing the Virtual Array 7000 family array controller and its associated hardware components. It also includes information on upgrading the controller configuration on the array. If you are unfamiliar with these procedures, it may be useful to have a copy of the *HP StorageWorks Virtual Array User & Service Guide* available for reference.
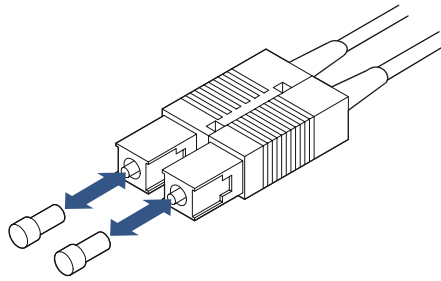
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Fiber Optic Cables

Caution **To prevent damage to the fiber optic cables, observe the following precautions.**

— Do not exceed a bend radius of 2 inches (5.1 cm).
— Grasp the connector when disconnecting a fiber optic cable; never pull on the cable.
— Install fiber optic covers (see Figure 1) after a cable is removed.

Figure 1   Fiber Optic Covers

Removing & Replacing Fiber Optic Cables

See Figure 2 and Figure 3 to remove and replace fiber optic cables.

The array controller uses one of two types of fiber optic cable connectors:

■ SC connectors (Figure 2) are large form factor connectors that plug into the GBIC on VA 7100 array controller. The GBIC then plugs into the HOST FC connector on the array controller.

■ LC connectors (Figure 3) are small form factor connectors that plug directly into the DISK FC and HOST FC connectors on VA 7400/7410 array controllers.

■ Both SC and LC connectors are keyed to install only one way.

Figure 2 Removing & Replacing a Fiber Optic Cable & GBIC (VA 7100 Array Controller)
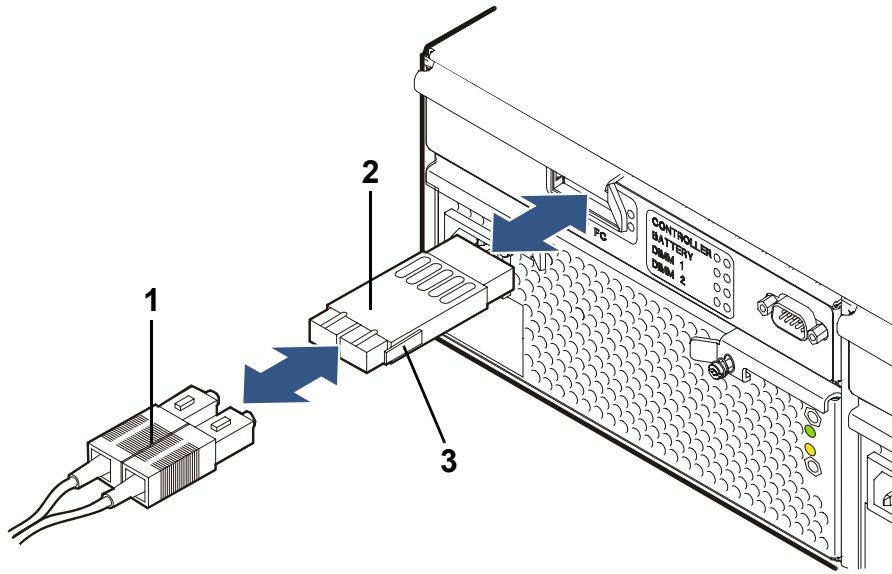
Figure 3 Removing & Replacing Fiber Optic Cables (VA 7110/7400/7410 Array Controller)
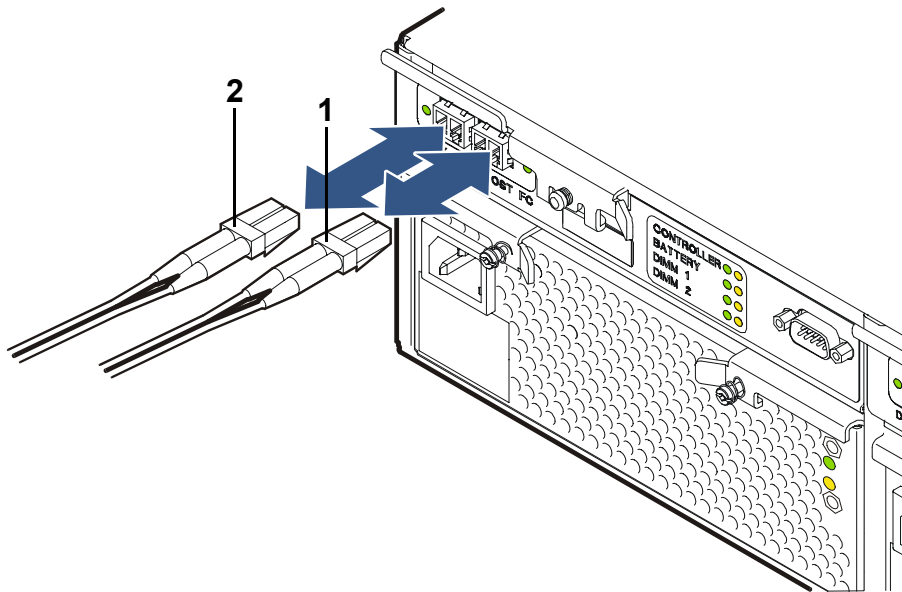
Gigabit Interface Converters (VA 7100 Array Controller Only)
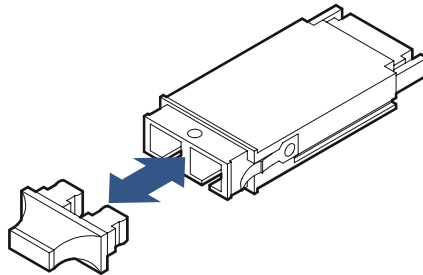
Removing a GBIC

1 Remove the fiber optic cable. See Figure 2.
2 Push in the GBIC tabs and gently pull the GBIC out of the HOST FC slot.

Replacing a GBIC

1 Remove the GBIC cover. See Figure 4.
2 With even pressure, gently push the GBIC into the HOST FC connector until it clicks into place. See Figure 2.
3 Replace the fiber optic cable.

Figure 4   GBIC Cover

Array Controllers

The array includes one of the types of array controllers listed in Table 1.

Table 1   Array Controllers

Product	Data Rate	Disk Enclosures Supported
VA 7100	1 Gbit/s	0
VA 7110	1 or 2 Gbit/s*	0-2
VA 7400/7410	1 or 2 Gbit/s*	0-6

*Default is 1 Gbit/s; 2 Gbit/s set using the Virtual Front Panel.

Removing an Array Controller
(HP Service Personnel Only)

The process of removing a controller is influenced by factors such the array configuration (single or dual controller) and by whether the operating system supports controller failover. The various task flows are shown in Figure 5.

Figure 5   Array Controller Removal & Replacement Flowchart

Start

Single or Dual Controller?

S → Stop I/Os to Controller (2)

D → Does OS Support Controller Failover? (1)

Offline / N

Y | Online

Remove & Replace Controller (3)

Single or Dual Controller?

S → Shutdown the Array

D → Remove & Replace Controller (3)

Single or Dual Controller?

S → Power-On the Array

D → Wait 5 min. for Auto Clone & Fast Reset

Resume I/Os

Notes:

(1) Consider the following:
<u>HP-UX</u> - Is LVM configured with alternate paths OR is ServiceGuard configured to fail over?
<u>WinNT</u> - Is controller in a "cluster-safe" environment?
<u>Win2k</u> - Is AutoPath installed?
<u>Linux</u> - No Failover Support.

(2) Stop all applications and file systems OR perform a host shutdown.

(3) Refer to "Removing/Replacing a Controller" in this chapter.

Caution	The array controller can be damaged by electrostatic discharge. Use the ESD kit provided when removing and installing an array controller.
	To prevent data loss, it is recommended that a full backup be performed before removing an array controller.
	Do not operate the array for more than 5 minutes with an array controller or filler panel removed. Either an array controller or filler panel must be installed to maintain proper airflow in the controller enclosure. Use the foam in the replacement array controller packaging to temporarily plug the empty slot.

1 Perform all necessary steps indicated in Figure 5.

2 **VA 7100:** Remove the fiber optic cable from the GBIC (see Figure 2).
   VA 7400/7410/7110: Remove the fiber optic cables from the DISK FC and HOST FC connectors (see Figure 3).

3 **VA 7100 only:** Remove the GBIC (see Figure 2, 3).

4 **VA 7100:** Slide the latch (Figure 6, 1) all the way to the left.
   VA 7400/7410/7110: Loosen the cam lever screw (Figure 7, 1) with a T-10 driver or flat-blade screwdriver.

5 **VA 7100:** Press down the lock (Figure 6, 2) and pull out the cam lever (3).
   VA 7400/7410/7110: Pull out the cam lever (Figure 7, 2).

WARNING	A hot surface is located on the underside of the array controller by the middle of the right-hand edge (facing the rear panel). To avoid burn injury, only touch the edges of the array controller. Do not touch the underside.
Caution	When the cam lever is pulled out, an early warning switch is activated which suspends mirroring between dual controllers and terminates all I/Os to the controllers.

6 Grasp the cam lever and slide the array controller out 4 inches (10 cm) (Figure 6 or Figure 7).

7 Grasp the edges of the array controller with both hands and pull it out of the slot.

8 **If the array controller was removed for a DIMM failure :**
Go to "Installing an Array Controller" on page 8.

If a DIMM failure did not occur:

a Remove the battery from the removed array controller. See "Removing an Array Controller Battery" on page 14.

b Remove the DIMMs from the removed array controller. See "Removing an Array Controller DIMM" on page 16.

Installing an Array Controller
(HP Service Personnel Only)

Caution   If the green BATTERY LED is flashing and you remove a DIMM, damage to the array controller or DIMM may occur.

Do not use a controller that has HP14 firmware as a replacement if the remaining controller has an earlier version of firmware. Earlier versions of firmware cannot overwrite HP14 firmware. Replacement controllers ordered from HP have HP13 or earlier firmware on them. If you are unsure of the firmware version on the controller, do not use it as a replacement.

1 If the green BATTERY LED on the new or upgrade array controller is off, go to step 2. If the green BATTERY LED on the new or upgrade array controller is flashing with a 5% duty cycle (battery fully charged), disconnect the battery from the battery terminal. See "Removing an Array Controller Battery" on page 14. Reconnect it and verify that the green BATTERY LED is off.

Note   Disconnecting the battery from the array controller resets a bit on the controller which disables battery power to the DIMMs.

2 Either install new DIMMs (ordered separately) on the new array controller or transfer functional DIMMs from the old controller. See "Installing an Array Controller DIMM" on page 17.

3 **VA 7100 only**: Slide the latch (Figure 6, 1) all the way to the left.

4 **VA 7100**: Press down the lock (Figure 6, 2) and pull out the cam lever (3).
VA 7400/7410/7110: Pull out the cam lever (Figure 7, 2).

5 Grasp the edges of the array controller with both hands and push it firmly into the slot. (Figure 6 or Figure 7).

6 Push in the cam lever (Figure 6, 3 or Figure 7, 2) until it clicks into place.

7 **VA 7100 only**: Slide the latch (Figure 6, 1) all the way to the right.

8 **VA 7400/7410/7110 only**: Tighten the cam lever screw (Figure 7, 1).

9 **VA 7100 only**: Replace the GBIC (Figure 2, 3).

10 Replace the fiber optic cables (see Figure 2 or Figure 3).

Note If you need to change the default Fibre Channel Loop ID on the array controller, use the following VFP command:

```
vfpmgr -L <loop id> -c <array controller card number>
```

Note The following step is only required if an HP-UX host is connected to the array using one of the following FC HBAs: A5158A, A6684A, A6685A, or A6795A.

11 From the HP-UX host, run the following command to allow the driver to use the new controller in the path:

```
/opt/fcms/bin/fcmsutil device_file replace_dsk remote-N-
Port-ID
```

Note A reboot of the host will also allow the driver to see the new controller. However, using the fcmsutil command is a much easier and quicker method of accomplishing this.

If you do not run the fcmsutil command, errors similar to the following will appear in syslog:

```
Unable to access previously accessed device at nport ID
0x2a.
'World-wide name' (unique identifier) for device at nport
ID 0x2a has changed. If the device has been replaced
intentionally, please use the fcmsutil(1M) command's
replace_dsk option to allow the new device to be used.
Fibre Channel Driver detected a parse error in the FLOGI/
PLOGI response returned by nport ID 0x2a. FLOGI/PLOGI Fail
Code = 0x6.
```

Figure 6   Removing & Installing a VA 7100 Controller
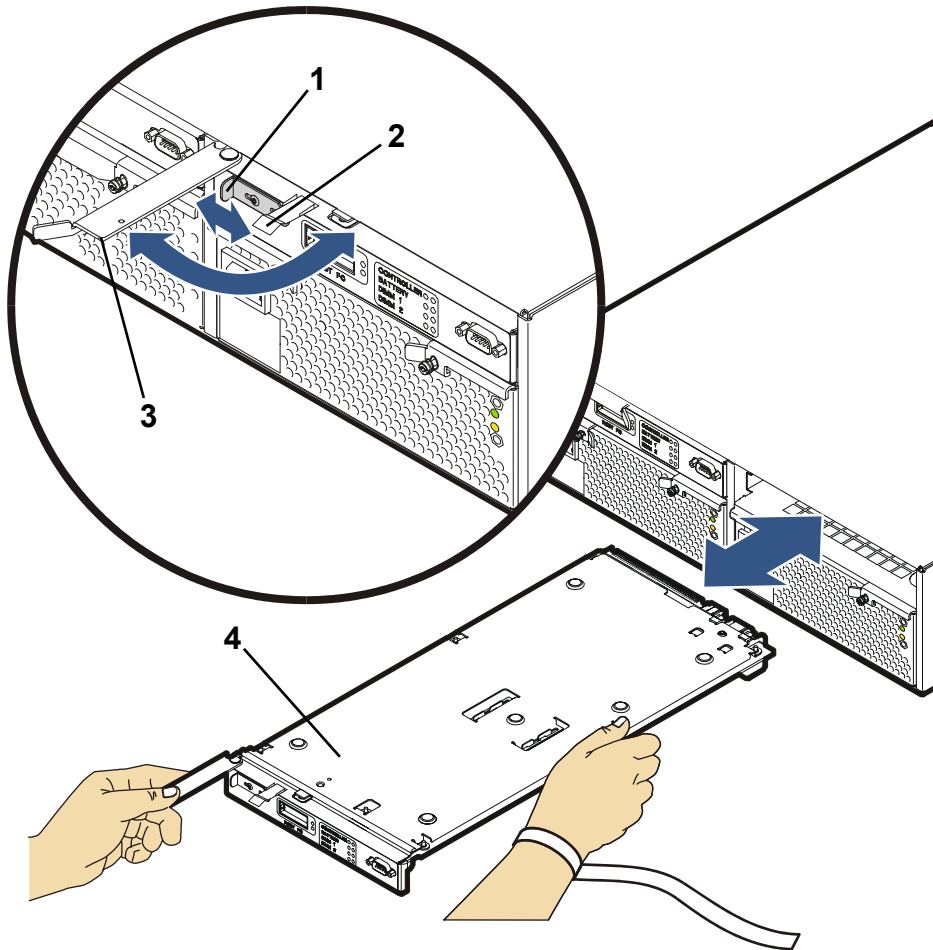
Figure 7 Removing & Installing a VA 7110/7400/7410 Array Controller
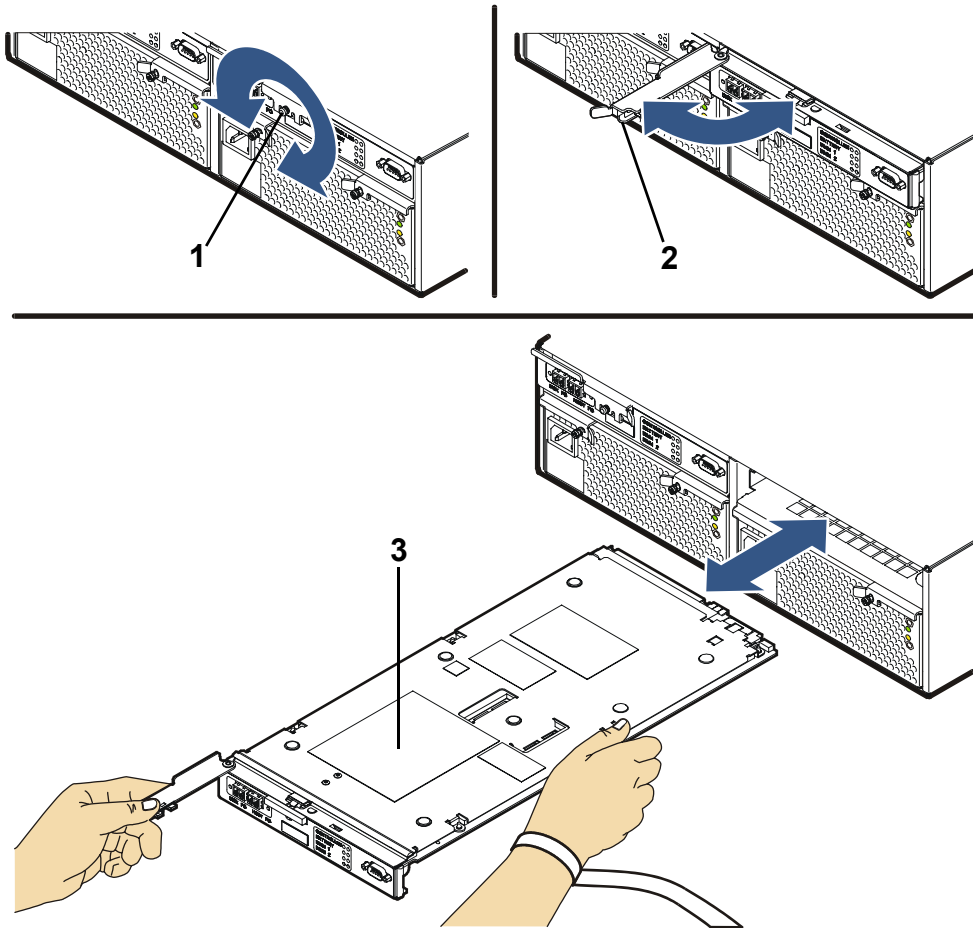
Array Controller Filler Panels

### Removing an Array Controller Filler Panel

Caution   Do not operate the array for more than 5 minutes with a controller or filler panel removed. Either a controller or filler panel must be installed in the slot to maintain proper airflow.

1 Loosen the cam lever screws (Figure 8, 1) with a T-10 driver or flat-blade screwdriver.

2 Pull out both cam levers (2) at the same time.

3 Pull the controller filler panel (3) out of the slot.

Installing an Array Controller Filler Panel

1 Pull out both cam levers (Figure 8, 2) at the same time.

2 Push the controller filler panel (3) firmly into the slot.

3 Push in both cam levers at the same time.

4 Tighten the cam lever screws (1).

Figure 8   Removing & Installing an Array Controller Filler Panel
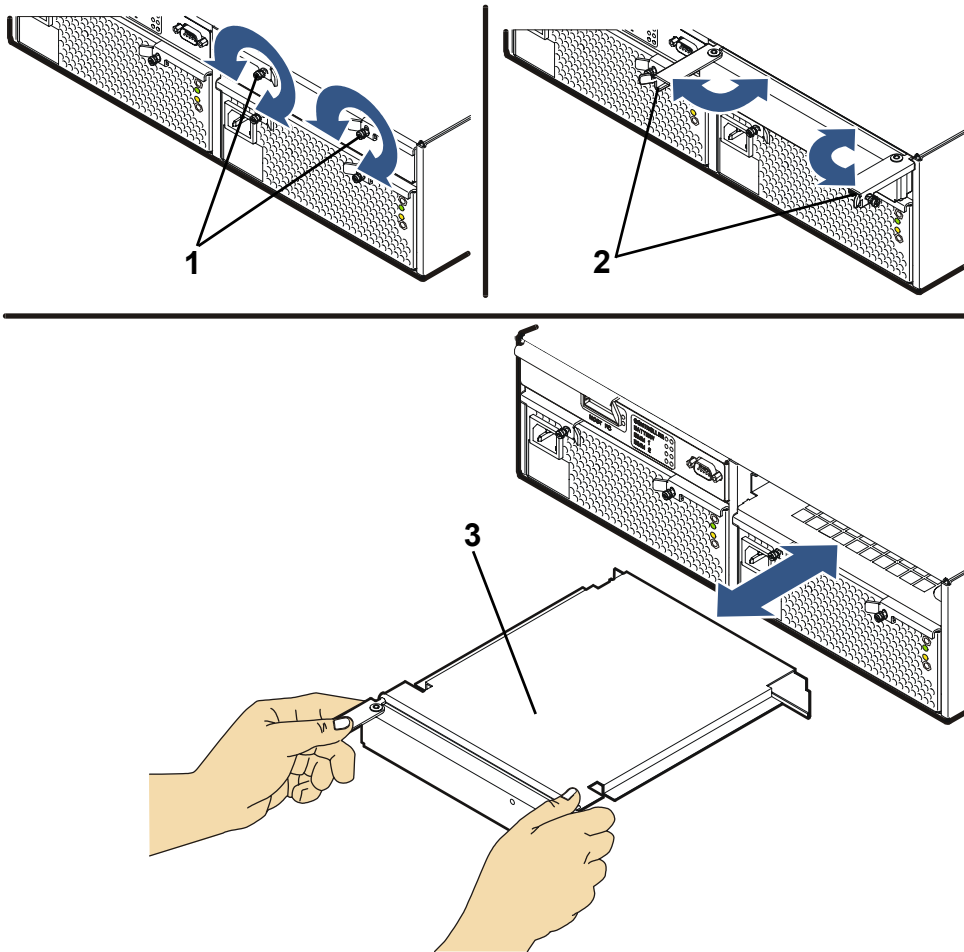
Array Controller Batteries

Caution   **Make sure you observe the following precautions.**

— Removing a battery may cause data loss. The battery supplies power to the DIMMs. To prevent data loss, you must either ensure the array is in a dual controller configuration, or you must perform an array Shutdown.

— If the array is in a dual controller configuration, it is recommended that you replace both batteries.

— The battery is a Lithium ion type. When removed, the battery must be recycled or disposed of properly. Replace the battery only with the same type.

— Battery shelf life is rated for up to 6 months at a maximum temperature of 25° C. If this storage temperature or duration is exceeded, it may be necessary to recharge the battery during normal operation of the controller.

Removing an Array Controller Battery

1 Remove the controller. See "Removing an Array Controller" on page 5.

2 Loosen the battery clamp screw (Figure 9, 1) with a T-20 driver.

3 Lift the battery clamp (Figure 9, 2) off of the battery.

4 Lift the battery connector (Figure 10, 1) off of the battery terminal.

5 Lift the battery (Figure 10, 3) off of the controller.

Figure 9 Removing & Installing a Battery
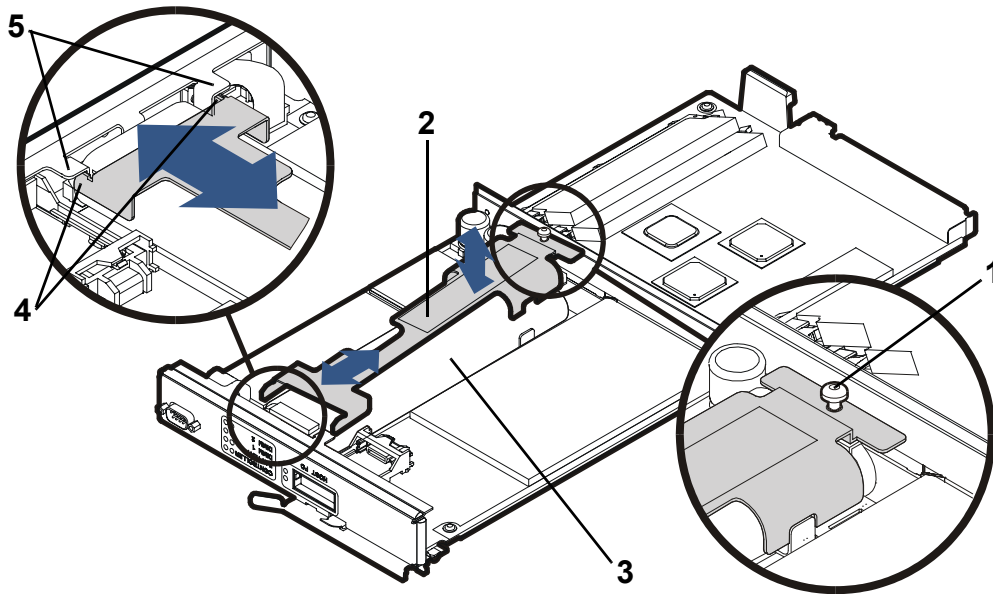

Installing an Array Controller Battery

1 Seat the battery connector (Figure 10, 1) on the battery terminal (2).

2 Lay the battery (Figure 10, 3) on the foam pad (4) and in the battery bracket
(5).

3 Place the battery clamp (Figure 9, 2) on the battery (3).

4 Slide the battery clamp forward so that the front tabs (Figure 9, 4) are positioned under the bulkhead tabs (5).

5 Tighten the battery clamp screw (Figure 9, 1) with a T-20 driver.

6 Replace the controller. See "Installing an Array Controller" on page 8.

Note   If the battery was replaced on a single controller, wait for the battery to charge before resuming I/Os.

Figure 10 Connecting a Battery
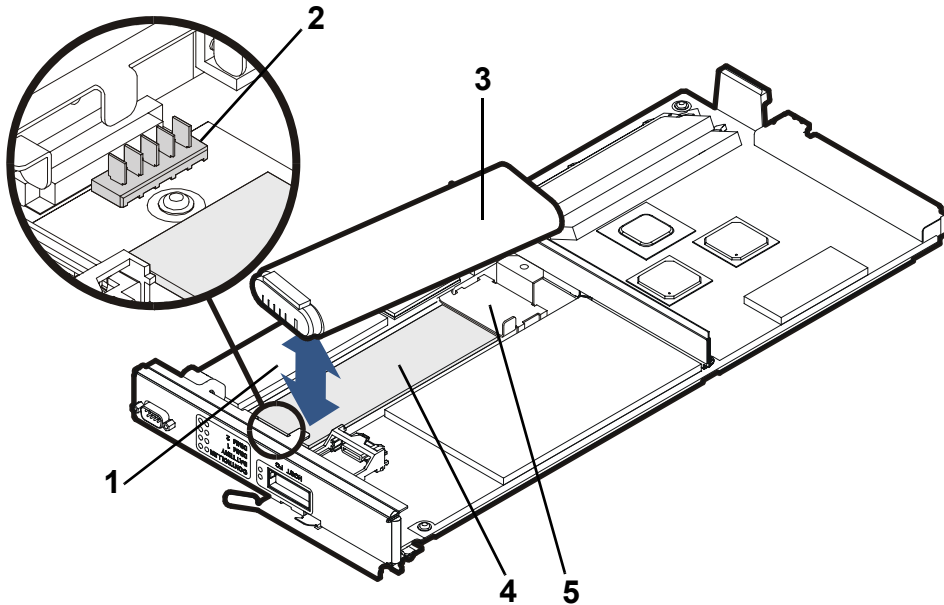
Array Controller DIMMs

Removing an Array Controller DIMM
(HP Service Personnel Only*)*

Caution   Controller firmware HP13 and earlier do not support more than 1 GB of memory. Data loss will occur if the controller contains more than 1 GB of memory with these firmware versions.

                     DIMMs can be damaged by electrostatic discharge. Use the ESD kit provided when removing and installing DIMMs.

1   Remove the array controller card. See "Removing an Array Controller" on page 5.

Caution   The battery must be removed to ensure there is no power to the DIMMS and to prevent damage to DIMMs caused by voltage spikes. After removing the battery, wait 2 minutes before

removing DIMMs. This allows residual current to drain from the DIMMs.

2 Remove the array controller battery. See "Removing an Array Controller Battery" on page 14.

3 Use your thumbs to pull out both DIMM extraction levers at the same time. See Figure 11. The DIMM will automatically pop out of the DIMM slot.

4 Remove the DIMM from the slot.

Installing an Array Controller DIMM
(HP Service Personnel Only)

Caution   Replacement DIMMs must have the same memory size as the DIMMs being replaced. Otherwise, the controller will report a Memory Mismatch. If the array is powered-on after the controller is replaced offline, power-on initialization will not complete if the DIMM memory in both controllers does not match.

1 Insert the DIMM evenly into the DIMM slot. See Figure 11.

2 Use your thumbs to apply even pressure to the top edge of the DIMM and push the DIMM firmly into the slot. The DIMM extraction levers will automatically seat the DIMM.

3 Replace the battery. See "Installing an Array Controller Battery" on page 15.

4 Replace the controller. See "Installing an Array Controller" on page 8.

Figure 11   Removing & Installing a DIMM
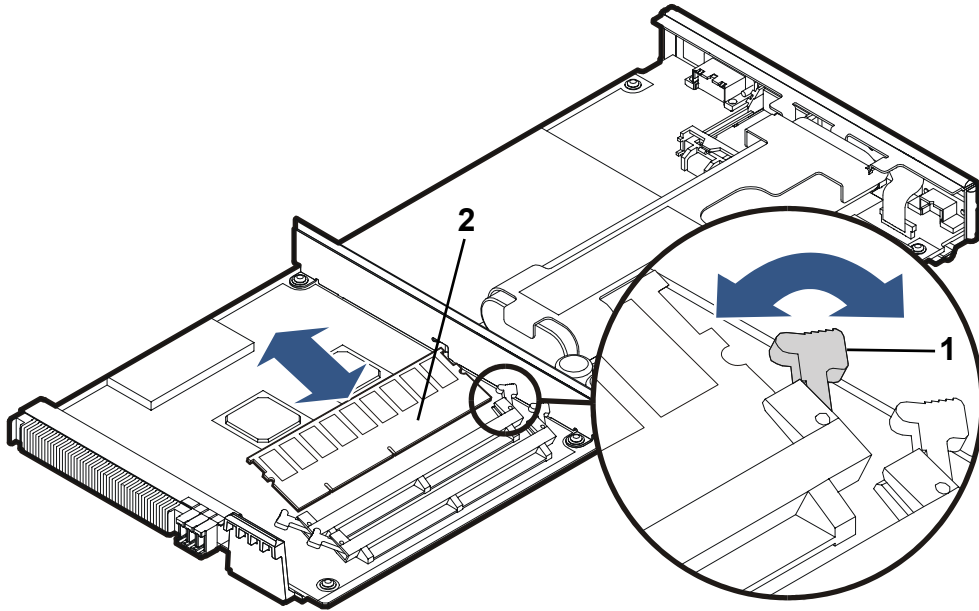
Upgrading Array Controller DIMMs

(HP Service Personnel Only)

The amount of controller cache can be increased by adding a second DIMM to each controller, or by replacing existing DIMMs with higher capacity DIMMs. Regardless of which strategy is used, both controllers must have the same DIMM configuration. Valid DIMM configurations are listed in Table 2.

Before beginning the upgrade, make sure you have the required DIMMs.

Caution   **Make sure you observe the following precautions.**

— It is recommended that a full backup be performed before starting this procedure.

— The array must be in a READY state before upgrading cache. The array must then be shutdown successfully and powered off before upgrading the controller DIMMs. Failure to shutdown the array could result in data loss.

— Controller firmware versions HP13 and earlier support a maximum of 1 Gbyte of cache per controller. Installing more than 1 Gbyte of memory can cause data loss.

— The DIMM in slot 1 must have the same memory size as the DIMM in slot 2. Otherwise, the controller will report a "Memory Mismatch".

To upgrade the controller DIMMs:

1 Alert all users that the array will be taken down. Dismount all volumes on the hosts accessing the array.

2 Ensure that the array is in a READY state, and then shutdown the array using Command View SDM or the VFP. Make sure the array shutdown is successful.

3 When the shutdown is complete, power off the array.

4 Remove one of the controllers. See "Removing an Array Controller" on page 5.

5 Remove the battery from the controller. See "Removing an Array Controller Battery" on page 14.

6 Wait two minutes, and then add or replace the DIMMs. See "Installing an Array Controller DIMM" on page 17.

7 Reinstall the battery on the controller. See "Installing an Array Controller Battery" on page 15.

8 Reinstall the controller. See "Installing an Array Controller" on page 8.

9 Repeat steps 4 - 8 for the other controller.

10 Power on the array and wait for all components to become ready.

11 On all hosts accessing the array, rescan for disks and remount all volumes on the array

Table 2   Valid Array Controller DIMM Configurations

Slot 1 DIMM (MB)	Slot 2 DIMM (MB)	Total Memory (MB)	VA 7100	VA 7110	VA 7400	VA 7410
256	Empty	256	Y	N	N	N
256	256	512	Y	N	Y	N
512	Empty	512	Y	N	Y	N
512	512	1024	Y	Y	Y	Y[a]
1024	Empty	1024	Y	Y	Y	Y
1024	1024	2048	N	Y	N	Y

a.This is a supported DIMM configuration, but new VA 7410 controllers will not use 512 MB DIMMs.

Upgrading Single to Dual Array Controllers (HP Service Personnel Only)

Caution   To prevent data loss, it is recommended that a full backup be performed before starting this procedure.

An array with a single controller can be upgraded to a dual controller configuration by adding an upgrade controller.

1   Install DIMMs (ordered separately) on the upgrade controller (see "Replacing a DIMM" in this chapter).

2   Install the upgrade controller. See "Installing an Array Controller" on page 8.