Replacing a DIMM in a FAS22xx system

You replace a DIMM in the controller module when your system registers an increasing number of correctable error correction codes (ECC); failure to do so causes a system panic.

Before you begin

All other components in the system must be functioning properly; if not, you must contact technical support.

You must replace the failed component with a replacement FRU component you received from your provider.

About this task

- You can use this procedure with all versions of Data ONTAP supported by your system.

Steps

Shutting down the target controller

You shut down or take over the target controller using different procedures, depending on whether it is part of an HA pair or a stand-alone system.

Choices

Shutting down a controller module in an HA pair

To shut down a controller module, you must determine the status of the impaired node and, if necessary, take over the impaired node so that the healthy partner continues to serve data from the impaired node's storage.

Steps

1. If running clustered Data ONTAP, check the status of the nodes in the cluster:

    a) Enter the following command at the system console of either node:

    cluster show

    The command produces output similar to the following:

    ```
    Node   Health   Eligibility
    ```

```
----- ------- ------------
node1 true     true
node2 true     true
node3 true     true
node4 true     true
4 entries were displayed.
```

b) Take one of the following actions, depending on the result of the command:

If...	Then...
All nodes show true for both health and eligibility.	Proceed to Step 3.
The impaired node shows false for health.	Proceed to the next step.
Any nodes show false for eligibility.	Resolve any cluster issues as needed before continuing with this procedure.
Any nodes other than the impaired node show false for health.	Correct the problems that cause the health issues on the nodes before continuing with this procedure.

2. Check the status of the impaired node (the node you want to perform maintenance on) by entering the following command at the system console of either node:

For...	Issue the command...
7-Mode	`cf status`
Clustered Data ONTAP	`storage failover show`

3. Take one of the following actions, depending on the result of the `cf status` or `storage failover show` command:

If...	Then...
Neither node is in takeover mode	Go to the next step in this procedure.
The healthy node took over the impaired node	The impaired node is in a state where you can begin removing it from the system chassis.
The impaired node took over the healthy node	a. Correct the problem that caused the takeover. b. Go back to the Step 1.

4. Take over and power down the impaired node by taking the following steps:

a) Enter one of the following commands from the healthy node's console and wait for the takeover to complete:

For systems operating in...	Issue the command...
7-Mode	`cf takeover`

Clustered Data ONTAP	• In Data ONTAP 8.1.0 or earlier:
	
	`storage failover takeover -fromnode healthy_node_name`
	• In Data ONTAP 8.1.1 or later:
	
	`storage failover takeover -ofnode impaired_node_name`

The impaired node is taken over and then automatically reboots and displays the Waiting for giveback... message.

Note: Leave the power supplies turned on to provide power to the healthy node.

b) Wait at least two minutes after takeover of the impaired node to ensure that the takeover completed successfully.

c) With the impaired node showing the Waiting for giveback... message, shut it down.

The method you use to shut down the node depends on whether remote management via a Service Processor (SP) is used and whether or not the system is in a dual-chassis or single-chassis configuration.

Is the SP configured?	Then...
Yes	Log in to the impaired node's SP and issue the following command: `system power off`
No, and the system is in a dual-chassis HA pair in which each controller is in a separate chassis.	Proceed to Step 5.
No, and the system is in a single-chassis HA pair in which both controllers are in the same chassis and share power supplies.	At the impaired node's prompt, press `Ctrl-C` and respond `Y` to halt the node.

The impaired node is now in a state where you can proceed to the next task.

Shutting down a stand-alone controller

For a stand-alone controller, you must perform a clean shutdown to ensure that all data has been written to disk. You must also disconnect the power supplies.

Steps

1. Enter the following commands from the system console:

If your system is configured in...	Then issue this command...
7-Mode	`halt`
clustered Data ONTAP	`halt local`

After you issue the command, wait until the system stops at the LOADER prompt.

> **Attention:** You must perform a clean system shutdown before replacing system components to avoid losing unwritten data in the nonvolatile memory (NVMEM). The NVMEM LED is marked with a battery symbol and is located on the controller module to the left of the label showing the MAC address. If the NVMEM LED is flashing, there is content in the NVMEM that has not been saved to disk. You need to reboot the controller module and proceed from the beginning of this procedure. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk.

2. If you are not already grounded, properly ground yourself.

3. Turn off the power supplies, unplug both power cords from the power source, and then remove the power cords.

Opening the system

To access components inside the controller module, you must open the system.

Steps

1. If you are not already grounded, properly ground yourself.

2. Unplug the system cables and SFPs from the controller module, as needed, and keep track of where the cables were connected.

Leave the cables in the cable management arm, so that when you reinstall the cable management arm, the cables are organized.

**3.** Remove the cable management arms from the left and right sides of the controller module and set them aside.
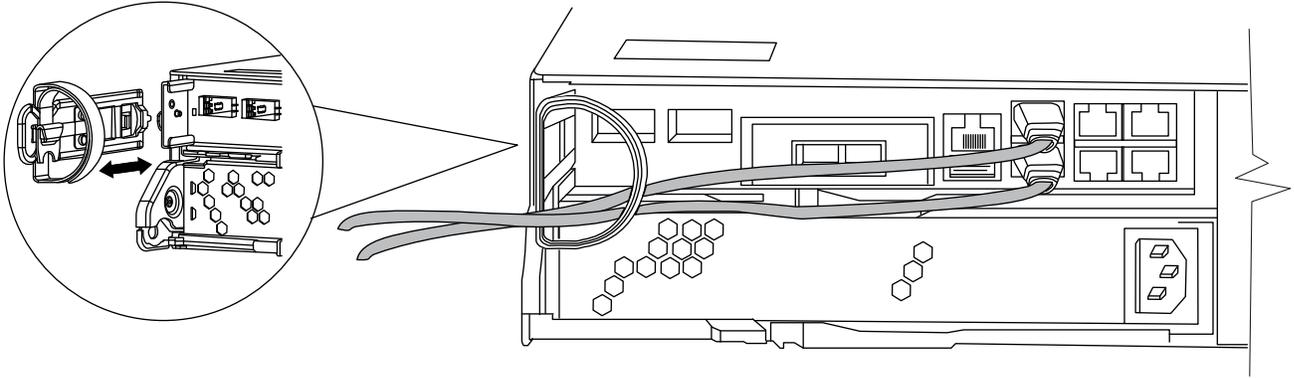
The illustration shows a FAS2220 or FAS2240-2 system. The procedure is the same for all FAS22xx systems.

4. Squeeze the latch on the cam handle until it releases, as shown in the following illustration. Open the cam handle fully to release the controller module from the midplane, and then, using two hands, pull the controller module out of the chassis.
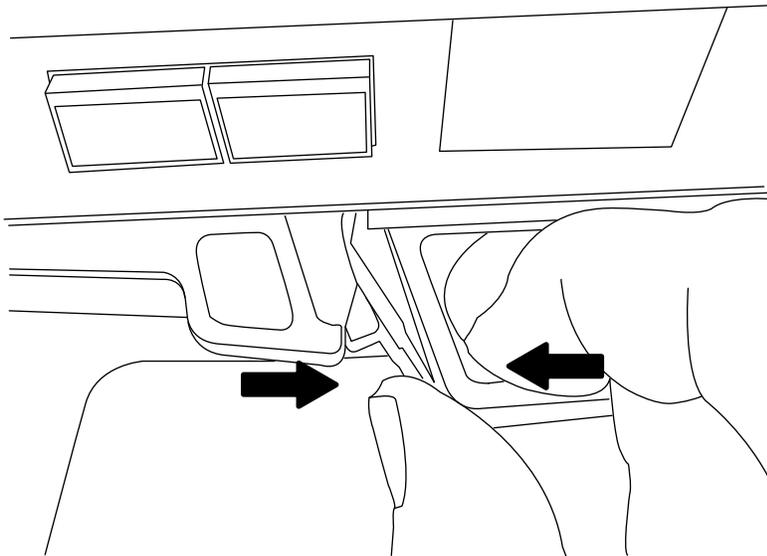
5. Pull the cam handle downward and slide the controller module out of the system.

6. Turn the controller module over and open it by sliding the blue tabs to release the cover, and then swing the cover up and open.
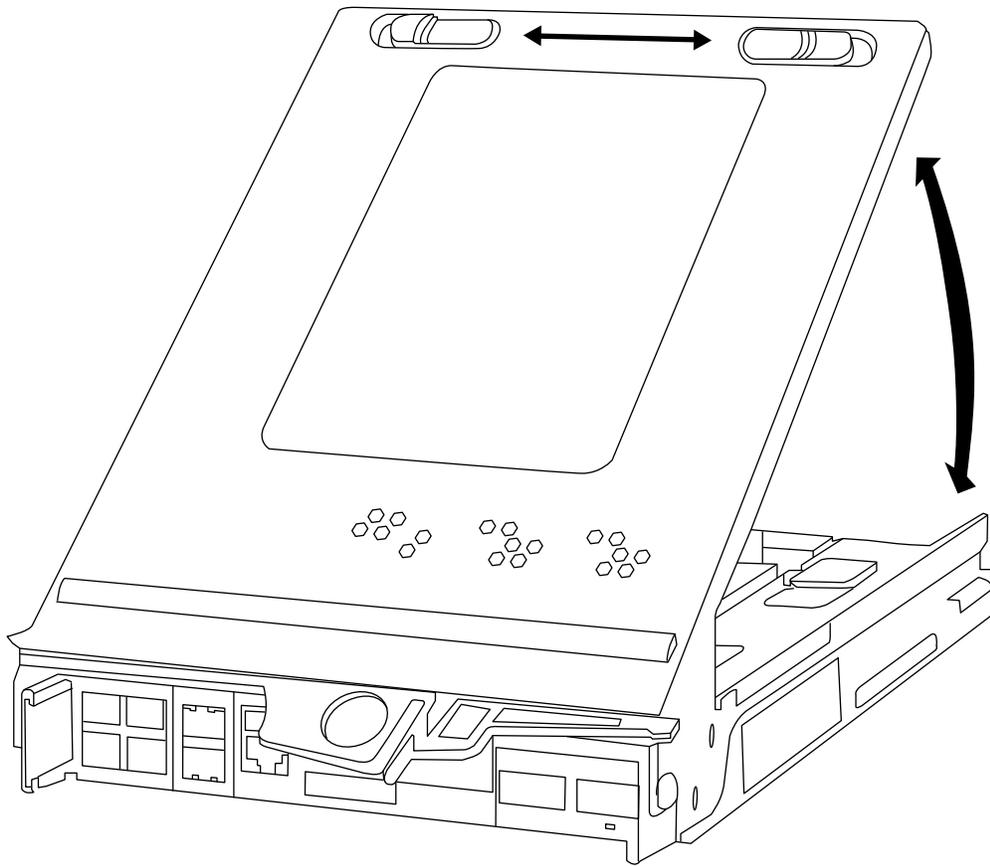
Removing the DIMMs

To remove a DIMM, you must perform a specific sequence of steps.

About this task

If you are replacing both DIMMs, remove them one at a time.

Steps

1. If you are not already grounded, properly ground yourself.

2. Unplug the NVMEM battery by pinching the latch on the face of the battery plug to release the lock clip, and then carefully pull the plug from the socket.

3. Locate the DIMMs.

   Note: Each system memory DIMM has an LED located on the board next to each DIMM slot. The LED is illuminated if the DIMM needs to be replaced.
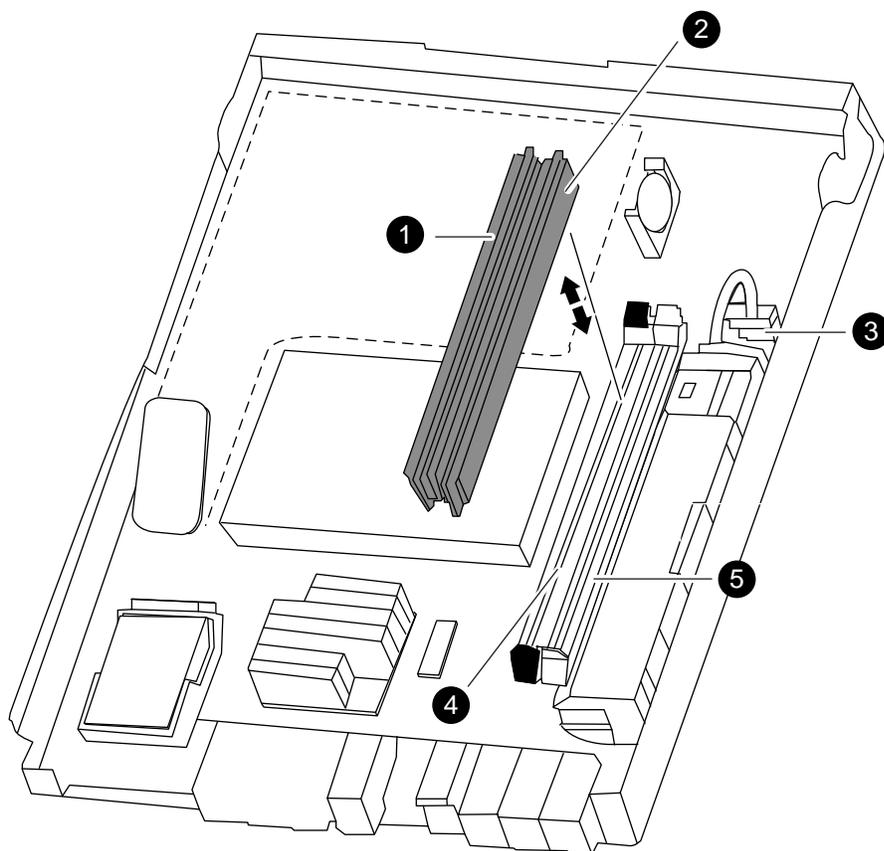
|	
❶	System DIMM
❷	NVMEM DIMM The NVMEM DIMM has an *NVMEM* label on one of the chips.
❸	NVMEM battery plug
❹	System DIMM slot
❺	NVMEM DIMM slot The NVMEM DIMM slot has white ejector tabs and is adjacent to the NVMEM battery.

4. Note the orientation of the DIMM in the socket so that you can insert the replacement DIMM in the proper orientation.

5. Slowly press down simultaneously on the two DIMM ejector tabs to eject the DIMM from its slot, and then lift it out of the slot.
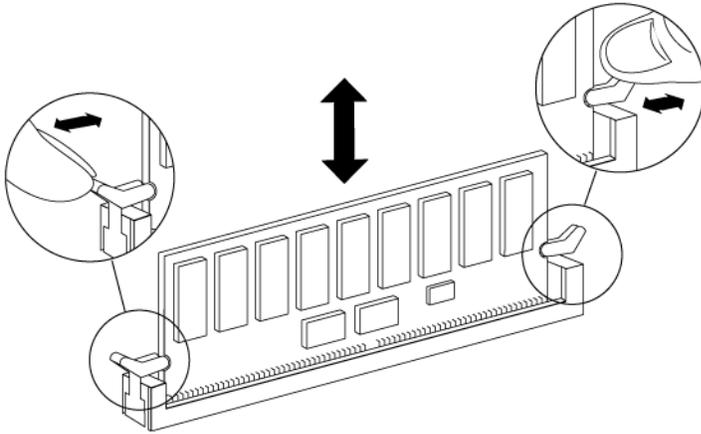
Attention: Carefully hold the DIMM by the edges to avoid pressure on the components on the DIMM circuit board.

Installing the DIMMs

If you are replacing both DIMMs, take care to install them in the correct slots. The NVMEM DIMM must go in the NVMEM DIMM slot, which has white tabs.

About this task

If the DIMMs are in the wrong slot, errors appear on the console and Data ONTAP does not automatically boot. If you encounter such errors or problems after replacing the DIMMs, you should verify the correct placement of the DIMMs.

Steps

1. If you are not already grounded, properly ground yourself.
2. Locate the slot where you are installing the new DIMM.
3. Remove the replacement DIMM from the antistatic shipping bag, hold the DIMM by the corners, and align it over the slot.

   The notch among the pins on the DIMM should line up with the tab in the socket.
4. Insert the DIMM straight into the slot.

   The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and reinsert it.

   Attention: Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot.
5. Push carefully, but firmly, on the top edge of the DIMM until the latches snap into place over the notches at the ends of the DIMM.
6. Plug the NVMEM battery into the controller module.

   Make sure that the plug locks down to the socket on the controller module.
7. Repeat the preceding steps to install additional DIMMs as needed.

Reinstalling the controller module and booting the system

After you replace a component within the controller module, you must reinstall the controller module in the system chassis and boot it to a state where you can run diagnostic tests on the replaced component.

About this task

Note: For HA pairs, the sequence in which you reinstall the controller module is especially important because it attempts to reboot as soon as you completely seat it in the chassis.

Steps

1. Close and latch the controller module cover, if necessary.

2. Reinstall the cable management arms and recable the controller module, as needed.

   When recabling, remember to reinstall the media converters (SFPs) if you are using fiber optic cables.

3. Reinstall the controller module:

If your system is in...	Then perform these steps...
An HA pair	**a.** Be prepared to interrupt the boot process. The controller module begins to boot as soon as it is fully seated in the chassis. **b.** With the cam handle in the open position, insert the controller module into the chassis, firmly pushing until the controller module meets the midplane, and then close the cam handle so that the latch clicks into the locked position and the controller module is fully seated. **Attention:** Do not use excessive force when sliding the controller module into the chassis; you might damage the connectors. **c.** As the system begins to boot, press **Ctrl-C** to interrupt the boot process when you see the message `Press Ctrl-C for Boot Menu`. **d.** From the boot menu, select the option for Maintenance mode.
A stand-alone configuration	**a.** With the cam handle in the open position, insert the controller module motherboard tray into the chassis, firmly pushing until the controller module meets the midplane, and then close the cam handle so that the latch clicks into the locked position and the controller module is fully seated. **Attention:** Do not use excessive force when sliding the controller module into the chassis; you might damage the connectors. **b.** Reconnect the power cables to the power supplies and to the power sources, turn on the power to start the boot process, and then press **Ctrl-C** to interrupt the boot process when you see the message `Press Ctrl-C for Boot Menu`. **c.** From the boot menu, select the option for Maintenance mode.

Important: During the boot process, you might see the following prompts:

- A prompt warning of a system ID mismatch and asking to override the system ID.
- A prompt warning that when entering Maintenance mode in a HA configuration you must ensure that the partner remains down.

You can safely respond **Y** to these prompts.

Related information

System-Level Diagnostics Guide

Running diagnostics on the DIMM

After installing a new DIMM, you should run diagnostics.

Steps

1. If the boot process was interrupted too late and the Boot Menu appeared, perform the following steps:

   a) Select the Maintenance mode option from the displayed menu.

   b) After the system boots to Maintenance mode, enter the following command at the prompt:

      `halt`

      After you issue the command, wait until the system stops at the LOADER prompt.

      Important: During the boot process, you might see the following prompts:

      - A prompt warning of a system ID mismatch and asking to override the system ID.
      - A prompt warning that when entering Maintenance mode in a HA configuration you must ensure that the partner remains down.

      You can safely respond **`y`** to these prompts.

2. On the node with the replaced component, enter the following command at the LOADER prompt:

   `boot_diags`

   Note: You must enter this command from the LOADER prompt for system-level diagnostics to function properly. The `boot_diags` command starts special drivers designed specifically for system-level diagnostics.

   Important: During the `boot_diags` process, you might see the following prompts:

   - A prompt warning of a system ID mismatch and asking to override the system ID.
   - A prompt warning that when entering Maintenance mode in a HA configuration you must ensure that the partner remains down.

   You can safely respond **`y`** to these prompts.

   The Maintenance mode prompt (*>) appears.

3. Clear the status logs by entering the following command:

   `sldiag device clearstatus`

4. Verify that the log is cleared by entering the following command:

   `sldiag device status`

   The following default response is displayed:
   `SLDIAG: No log messages are present.`

5. Check the status of the system memory by entering the following command at the prompt, depending on which DIMM was replaced:

If the DIMM that was replaced was the...	Then issue this command...
NVMEM DIMM	**`sldiag device run -dev nvmem`**
System DIMM	**`sldiag device run -dev mem`**

6. View the status of the test by entering the following command:

   sldiag device status

   Your storage system provides the following output while the tests are still running:
   There are still test(s) being processed.
   After all the tests are complete, the following response appears by default:
   *> <SLDIAG:_ALL_TESTS_COMPLETED>

7. Verify that no hardware problems resulted from the addition or replacement of hardware components on your system by entering the following command:

   sldiag device status [-dev *devtype*] [-name *device*] -long -state failed

   System-level diagnostics returns you to the prompt if there are no test failures, or lists the full status of failures resulting from testing the component.

8. Proceed based on the result of the preceding step:

If the system-level diagnostics tests...	Then...

Were completed without any failures	a. Clear the status logs by entering the following command:
	
	   sldiag device clearstatus
	
	b. Verify that the log is cleared by entering the following command:
	
	   sldiag device status
	
	   The following default response is displayed:
	   SLDIAG: No log messages are present.
	
	You have completed system-level diagnostics.

Resulted in some test failures	Determine the cause of the problem:
	
	a. Exit Maintenance mode by entering the following command:
	
	   halt
	
	   After you issue the command, wait until the system stops at the LOADER prompt.
	
	b. Turn off or leave on the power supplies, depending on how many controller modules are in the chassis:
	
	   • If you have two controller modules in the chassis, leave the power supplies turned on to provide power to the other controller module.
	   • If you have one controller module in the chassis, turn off the power supplies and unplug them from the power sources.
	
	c. Check the controller module you are servicing and verify that you have observed all the considerations identified for running system-level diagnostics, that cables are securely connected, and that hardware components are properly installed in the storage system.
	
	d. Boot the controller module you are servicing, interrupting the boot by pressing **Ctrl-C**:
	
	   • If you have two controller modules in the chassis, fully seat the controller module you are servicing in the chassis.
	     The controller module boots up when fully seated.
	   • If you have one controller module in the chassis, connect the power supplies and turn them on.
	
	e. Rerun the system-level diagnostic tests.

Related information

System-Level Diagnostics Guide

Completing the replacement process

After you replace the part, you can return the failed part to NetApp, as described in the RMA instructions shipped with the kit. Contact technical support at *support.netapp.com*, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific) if you need the RMA number or additional help with the replacement procedure.

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