



# **Replace the caching module - AFF A220 and FAS2700**

## **ONTAP Systems**

Doug Thompson, Martin Houser, Thripura Naidu Parangsam  
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# Replace the caching module - AFF A220 and FAS2700

You must replace the caching module in the controller module when your system registers a single AutoSupport (ASUP) message that the module has gone offline; failure to do so results in performance degradation.

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

## Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

### Option 1: Most configurations

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

#### About this task

If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy node shows false for eligibility and health, you must correct the issue before shutting down the impaired node.

+ [ONTAP 9 System Administration Reference](#)

You might want to erase the contents of your caching module before replacing it.

#### Steps

1. Although data on the caching module is encrypted, you might want to erase any data from the impaired caching module and verify that the caching module has no data:
  - a. Erase the data on the caching module: `system controller flash-cache secure-erase run`
  - b. Verify that the data has been erased from the caching module: `system controller flash-cache secure-erase show -node node_name`

The output should display the caching module status as erased.
2. If the impaired node is part of an HA pair, disable automatic giveback from the console of the healthy node: `storage failover modify -node local -auto-giveback false`
3. Take the impaired node to the LOADER prompt:

If the impaired node is displaying...	Then...
The LOADER prompt	Go to the next step.

If the impaired node is displaying...	Then...
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.
System prompt or password prompt (enter system password)	<p>Take over or halt the impaired node:</p> <ul style="list-style-type: none"> <li>For an HA pair, take over the impaired node from the healthy node: <code>storage failover takeover -ofnode <i>impaired_node_name</i></code></li> </ul> <p>When the impaired node shows Waiting for giveback..., press Ctrl-C, and then respond <code>y</code>.</p> <ul style="list-style-type: none"> <li>For a stand-alone system: <code>system node halt <i>impaired_node_name</i></code></li> </ul>

- If the system has only one controller module in the chassis, turn off the power supplies, and then unplug the impaired node's power cords from the power source.

## Option 2: Controller is in a two-node MetroCluster

To shut down the impaired node, you must determine the status of the node and, if necessary, switch over the node so that the healthy node continues to serve data from the impaired node storage.

### About this task

- If you are using NetApp Storage Encryption, you must have reset the MSID using the instructions in the "Returning SEDs to unprotected mode" section of the *ONTAP 9 NetApp Encryption Power Guide*.

[ONTAP 9 NetApp Encryption Power Guide](#)

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy node.

### Steps

- Check the MetroCluster status to determine whether the impaired node has automatically switched over to the healthy node: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

*If the impaired node...	Then...*
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy node: <code>metrocluster switchover</code>

*If the impaired node...	Then...*
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

3. Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes      RAID
Status
-----
...
aggr_b2        227.1GB   227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcclA::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
  Start Time: 7/29/2016 20:54:41
  End Time: 7/29/2016 20:54:42
  Errors: -
```

8. On the impaired controller module, disconnect the power supplies.

## Step 2: Open the system

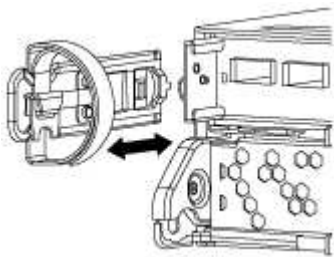
To access components inside the controller, you must first remove the controller module from the system and then remove the cover on the controller module.

### Steps

1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

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

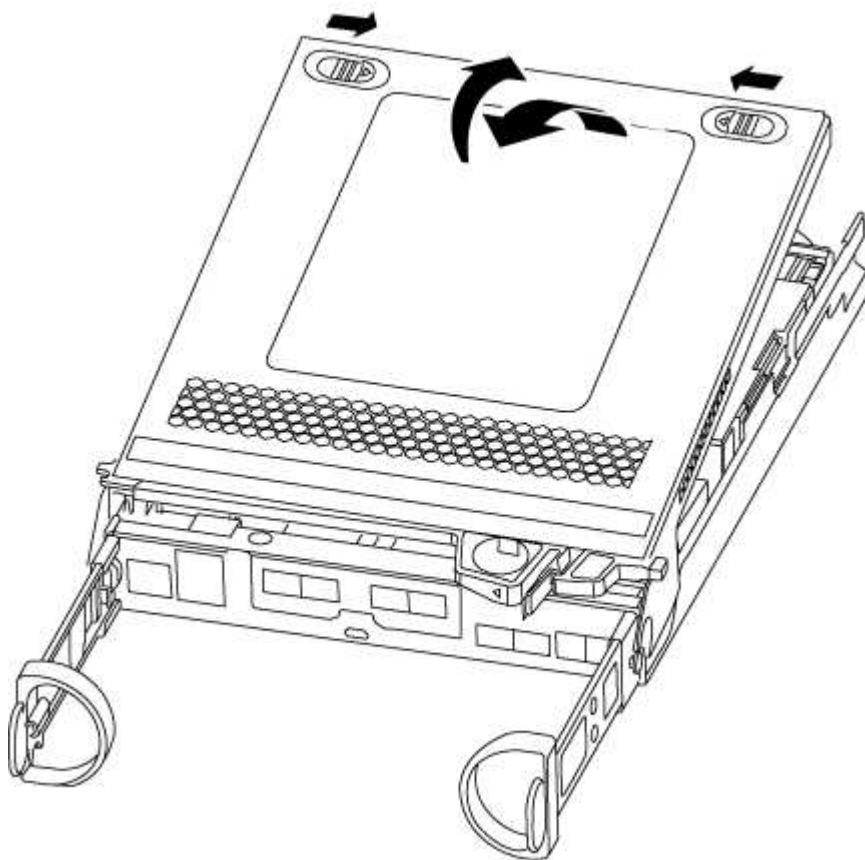
3. Remove and set aside the cable management devices from the left and right sides of the controller module.



4. Squeeze the latch on the cam handle until it releases, 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. Turn the controller module over and place it on a flat, stable surface.
6. Open the cover by sliding in the blue tabs to release the cover, and then swing the cover up and open.



### Step 3: Replace a caching module

To replace a caching module referred to as the M.2 PCIe card on the label on your

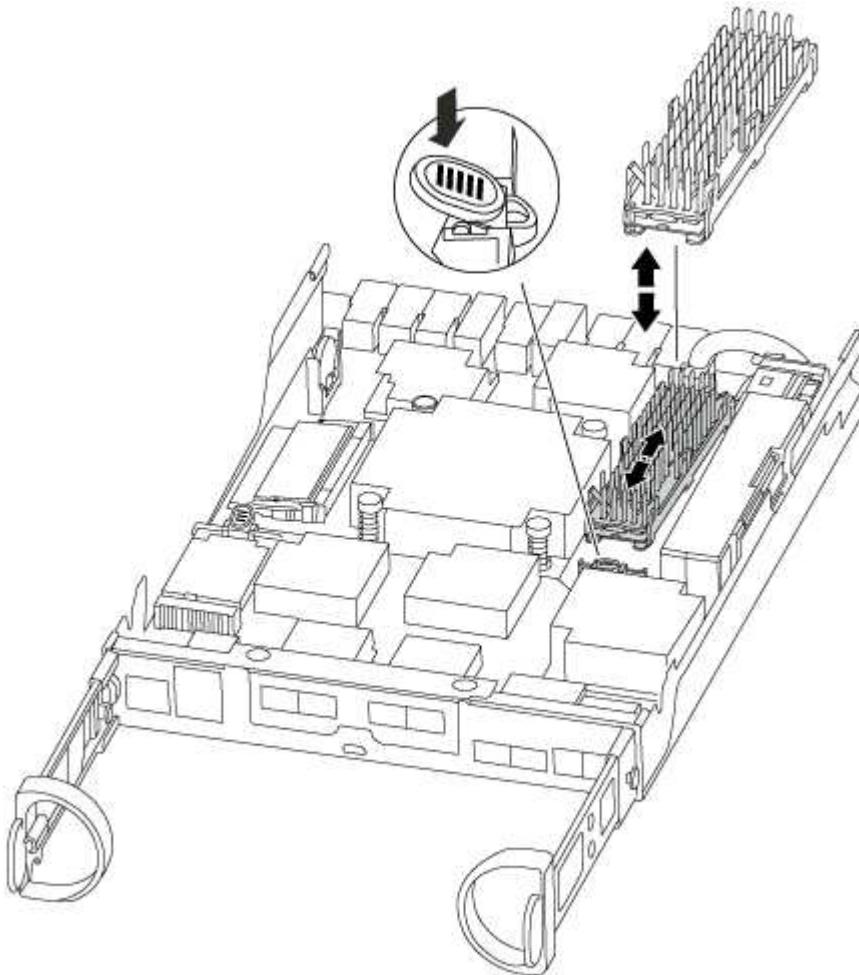
controller, locate the slot inside the controller and follow the specific sequence of steps.

Your storage system must meet certain criteria depending on your situation:

- It must have the appropriate operating system for the caching module you are installing.
- It must support the caching capacity.
- All other components in the storage system must be functioning properly; if not, you must contact technical support.

### Steps

1. If you are not already grounded, properly ground yourself.
2. Locate the caching module at the rear of the controller module and remove it.
  - a. Press the release tab.
  - b. Remove the heatsink.



3. Gently pull the caching module straight out of the housing.
4. Align the edges of the caching module with the socket in the housing, and then gently push it into the socket.
5. Verify that the caching module is seated squarely and completely in the socket.

If necessary, remove the caching module and reseat it into the socket.



6. Reseat and push the heatsink down to engage the locking button on the caching module housing.
7. Close the controller module cover, as needed.

## Step 4: Reinstall the controller module

After you replace components in the controller module, reinstall it into the chassis.

### Steps

1. If you are not already grounded, properly ground yourself.
2. If you have not already done so, replace the cover on the controller module.
3. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.







Do not completely insert the controller module in the chassis until instructed to do so.

4. Recable the system, as needed.

If you removed the media converters (QSFPs or SFPs), remember to reinstall them if you are using fiber optic cables.

5. Complete the reinstallation of the controller module:

If your system is in...	Then perform these steps...
An HA pair	<p>The controller module begins to boot as soon as it is fully seated in the chassis. Be prepared to interrupt the boot process.</p> <ol style="list-style-type: none"> <li>With the cam handle in the open position, firmly push the controller module in until it meets the midplane and is fully seated, and then close the cam handle to the locked position.</li> </ol> <div data-bbox="703 426 756 478">  </div> <div data-bbox="818 405 1360 506"> <p>Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.</p> </div> <p>The controller begins to boot as soon as it is seated in the chassis.</p> <ol style="list-style-type: none"> <li>If you have not already done so, reinstall the cable management device.</li> <li>Bind the cables to the cable management device with the hook and loop strap.</li> <li>When you see the message <code>Press Ctrl-C for Boot Menu</code>, press <code>Ctrl-C</code> to interrupt the boot process.</li> </ol> <div data-bbox="703 993 756 1045">  </div> <div data-bbox="818 936 1448 1108"> <p>If you miss the prompt and the controller module boots to ONTAP, enter <code>halt</code>, and then at the <code>LOADER</code> prompt enter <code>boot_ontap</code>, press <code>Ctrl-C</code> when prompted, and then boot to Maintenance mode.</p> </div> <ol style="list-style-type: none"> <li>Select the option to boot to Maintenance mode from the displayed menu.</li> </ol>

If your system is in...	Then perform these steps...
A stand-alone configuration	<p>a. With the cam handle in the open position, firmly push the controller module in until it meets the midplane and is fully seated, and then close the cam handle to the locked position.</p> <div>  <p>Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.</p> </div> <p>b. If you have not already done so, reinstall the cable management device.</p> <p>c. Bind the cables to the cable management device with the hook and loop strap.</p> <p>d. 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 <b>Ctrl-C</b> after you see the <b>Press Ctrl-C for Boot Menu</b> message.</p> <div>  <p>If you miss the prompt and the controller module boots to ONTAP, enter <code>halt</code>, and then at the <b>LOADER</b> prompt enter <code>boot_ontap</code>, press <b>Ctrl-C</b> when prompted, and then boot to Maintenance mode.</p> </div> <p>e. From the boot menu, select the option for Maintenance mode.</p>

## Step 5: Run system-level diagnostics

After installing a new caching module, you should run diagnostics.

Your system must be at the **LOADER** prompt to start System Level Diagnostics.

All commands in the diagnostic procedures are issued from the node where the component is being replaced.

### Steps

- If the node to be serviced is not at the **LOADER** prompt, perform the following steps:
  - Select the Maintenance mode option from the displayed menu.
  - After the node boots to Maintenance mode, halt the node: `halt`

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



During the boot process, you can safely respond `y` to prompts:

- At the **LOADER** prompt, access the special drivers specifically designed for system-level diagnostics to function properly: `boot_diags`

During the boot process, you can safely respond `y` to the prompts until the Maintenance mode prompt (`*>`)

appears.

3. Run diagnostics on the caching module: `sldiag device run -dev fcache`
4. Verify that no hardware problems resulted from the replacement of the caching module: `sldiag device status -dev fcache -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.

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

If the system-level diagnostics tests...	Then...
Were completed without any failures	<div>a. Clear the status logs: <code>sldiag device clearstatus</code></div> <div>b. Verify that the log was cleared: <code>sldiag device status</code></div> <div>The following default response is displayed:</div> <div>SLDIAG: No log messages are present.</div> <div>c. Exit Maintenance mode: <code>halt</code></div> <div>The node displays the LOADER prompt.</div> <div>d. Boot the node from the LOADER prompt: <code>bye</code></div> <div>e. Return the node to normal operation:</div> <div><b>If your node is in an HA pair</b>, perform a give back: <code>storage failover giveback -ofnode replacement_node_name</code></div> <div><b>Note:</b> If you disabled automatic giveback, re-enable it with the <code>storage failover modify</code> command.</div> <div><b>If your node is in a stand-alone configuration</b>, proceed to the next step. No action is required.</div> <div>You have completed system-level diagnostics.</div>

If the system-level diagnostics tests...	Then...
Resulted in some test failures	<p>Determine the cause of the problem:</p> <ol style="list-style-type: none"> <li>a. Exit Maintenance mode: <code>halt</code></li> </ol> <p>After you issue the command, wait until the system stops at the LOADER prompt.</p> <ol style="list-style-type: none"> <li>b. Turn off or leave on the power supplies, depending on how many controller modules are in the chassis:             <ul style="list-style-type: none"> <li>◦ If you have two controller modules in the chassis, leave the power supplies turned on to provide power to the other controller module.</li> <li>◦ If you have one controller module in the chassis, turn off the power supplies and unplug them from the power sources.</li> </ul> </li> <li>c. 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.</li> <li>d. Boot the controller module you are servicing, interrupting the boot by pressing <code>Ctrl-C</code> when prompted to get to the Boot menu:             <ul style="list-style-type: none"> <li>◦ If you have two controller modules in the chassis, fully seat the controller module you are servicing in the chassis.</li> </ul> <p>The controller module boots up when fully seated.</p> <ul style="list-style-type: none"> <li>◦ If you have one controller module in the chassis, connect the power supplies, and then turn them on.</li> </ul> </li> <li>e. Select Boot to maintenance mode from the menu.</li> <li>f. Exit Maintenance mode by entering the following command: <code>halt</code></li> </ol> <p>After you issue the command, wait until the system stops at the LOADER prompt.</p> <ol style="list-style-type: none"> <li>g. Rerun the system-level diagnostic test.</li> </ol>

## Step 6: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

### Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured      enabled    heal roots
completed
      cluster_B
      controller_B_1 configured      enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      switchover
Remote: cluster_A configured      waiting-for-switchback
```

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      normal
Remote: cluster_A configured      normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

## Step 7: Return the failed part to NetApp

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 [NetApp Support](#), 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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