



# **Boot media**

Install and maintain

NetApp

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# Boot media

## Overview of boot media replacement - AFF A700s

Learn about boot media replacement on an AFF A700s system and understand the recovery methods. The primary boot media stores the ONTAP boot image that the system uses during startup. You can restore the primary boot media image using the ONTAP image from the secondary boot media or, if necessary, from a USB flash drive formatted to FAT32.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

If your secondary boot media has failed or is missing the image.tgz file, you must restore the primary boot media using a USB flash drive. The drive must be formatted to FAT32 and must have the appropriate amount of storage to hold the image\_xxx.tgz file.

- The replacement process restores the var file system from the secondary boot media or USB flash drive to the primary boot media.
- You must replace the failed component with a replacement FRU component you received from your provider.
- It is important that you apply the commands in these steps on the correct controller:
  - The *impaired* controller is the controller on which you are performing maintenance.
  - The *healthy* controller is the HA partner of the impaired controller.

If you need to replace the secondary boot media while the primary boot media is installed and healthy, contact NetApp Support and mention the [How to replace the secondary boot device of an AFF A700s](#) KB article.

## Check encryption key support and status - AFF A700s

Verify encryption key support and status before shutting down the impaired controller on an AFF A700s system. This procedure includes checking ONTAP version compatibility with NetApp Volume Encryption (NVE), verifying the key manager configuration, and backing up encryption information to ensure data security during boot media recovery.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

### Step 1: Check NVE support and download the correct ONTAP image

Determine whether your ONTAP version supports NetApp Volume Encryption (NVE) so you can download the correct ONTAP image for the boot media replacement.

#### Steps

1. Check if your ONTAP version supports encryption:

```
version -v
```

If the output includes 10no-DARE, NVE is not supported on your cluster version.

## 2. Download the appropriate ONTAP image based on NVE support:

- If NVE is supported: Download the ONTAP image with NetApp Volume Encryption
- If NVE is not supported: Download the ONTAP image without NetApp Volume Encryption



Download the ONTAP image from the NetApp Support Site to your HTTP or FTP server or a local folder. You will need this image file during the boot media replacement procedure.

## Step 2: Verify key manager status and back up configuration

Before shutting down the impaired controller, verify the key manager configuration and back up the necessary information.

### Steps

#### 1. Determine which key manager is enabled on your system:

ONTAP version	Run this command
ONTAP 9.14.1 or later	<pre>security key-manager keystore show</pre> <ul style="list-style-type: none"><li>• If EKM is enabled, EKM is listed in the command output.</li><li>• If OKM is enabled, OKM is listed in the command output.</li><li>• If no key manager is enabled, No key manager keystores configured is listed in the command output.</li></ul>
ONTAP 9.13.1 or earlier	<pre>security key-manager show-key-store</pre> <ul style="list-style-type: none"><li>• If EKM is enabled, external is listed in the command output.</li><li>• If OKM is enabled, onboard is listed in the command output.</li><li>• If no key manager is enabled, No key managers configured is listed in the command output.</li></ul>

#### 2. Depending on whether a key manager is configured on your system, do one of the following:

##### If no key manager is configured:

You can safely shut down the impaired controller and proceed to the shutdown procedure.

##### If a key manager is configured (EKM or OKM):

- Enter the following query command to display the status of the authentication keys in your key manager:

```
security key-manager key query
```

- Review the output and check the value in the Restored column. This column indicates whether the

authentication keys for your key manager (either EKM or OKM) have been successfully restored.

3. Complete the appropriate procedure based on your key manager type:

## **External Key Manager (EKM)**

Complete these steps based on the value in the Restored column.

### **If all keys show true in the Restored column:**

You can safely shut down the impaired controller and proceed to the shutdown procedure.

### **If any keys show a value other than true in the Restored column:**

- Restore the external key management authentication keys to all nodes in the cluster:

```
security key-manager external restore
```

If the command fails, contact NetApp Support.

- Verify that all authentication keys are restored:

```
security key-manager key query
```

Confirm that the Restored column displays true for all authentication keys.

- If all keys are restored, you can safely shut down the impaired controller and proceed to the shutdown procedure.

## **Onboard Key Manager (OKM)**

Complete these steps based on the value in the Restored column.

### **If all keys show true in the Restored column:**

- Back up the OKM information:

- Switch to advanced privilege mode:

```
set -priv advanced
```

Enter y when prompted to continue.

- Display the key management backup information:

```
security key-manager onboard show-backup
```

- Copy the backup information to a separate file or your log file.

You will need this backup information if you need to manually recover OKM during the replacement procedure.

- Return to admin mode:

```
set -priv admin
```

- You can safely shut down the impaired controller and proceed to the shutdown procedure.

### **If any keys show a value other than true in the Restored column:**

a. Synchronize the onboard key manager:

```
security key-manager onboard sync
```

Enter the 32-character alphanumeric onboard key management passphrase when prompted.



This is the cluster-wide passphrase you created when you initially configured the Onboard Key Manager. If you do not have this passphrase, contact NetApp Support.

b. Verify all authentication keys are restored:

```
security key-manager key query
```

Confirm that the Restored column displays `true` for all authentication keys and the Key Manager type shows `onboard`.

c. Back up the OKM information:

i. Switch to advanced privilege mode:

```
set -priv advanced
```

Enter `y` when prompted to continue.

ii. Display the key management backup information:

```
security key-manager onboard show-backup
```

iii. Copy the backup information to a separate file or your log file.

You will need this backup information if you need to manually recover OKM during the replacement procedure.

iv. Return to admin mode:

```
set -priv admin
```

d. You can safely shut down the impaired controller and proceed to the shutdown procedure.

## Shut down the controller - AFF A700s

Shut down the impaired controller on an AFF A700s system after completing encryption checks. This procedure includes taking the controller to the LOADER prompt, capturing boot environmental variables for reference, and preparing the controller for boot media replacement.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

After completing the NVE or NSE tasks, you need to complete the shutdown of the impaired controller.

## Steps

- a. Take the impaired controller to the LOADER prompt:

If the impaired controller displays...	Then...
The LOADER prompt	Go to Remove controller module.
Waiting for giveback...	Press Ctrl-C, and then respond <i>y</i> when prompted.
System prompt or password prompt (enter system password)	<p>Take over or halt the impaired controller from the healthy controller: storage failover takeover -ofnode impaired_node_name</p> <p>When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <i>y</i>.</p>

- b. From the LOADER prompt, enter: `printenv` to capture all boot environmental variables. Save the output to your log file.



This command may not work if the boot device is corrupted or non-functional.

## Replace the boot media - AFF A700s

Replace the failed boot media on an AFF A700s controller module. This procedure includes removing the controller module from the chassis, locating the failed boot media using the lit LED indicator, physically replacing the boot media component, and restoring the system to normal operation.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

### Step 1: Remove the controller module

You must remove the controller module from the chassis when you replace the controller module or replace a component inside the controller module.

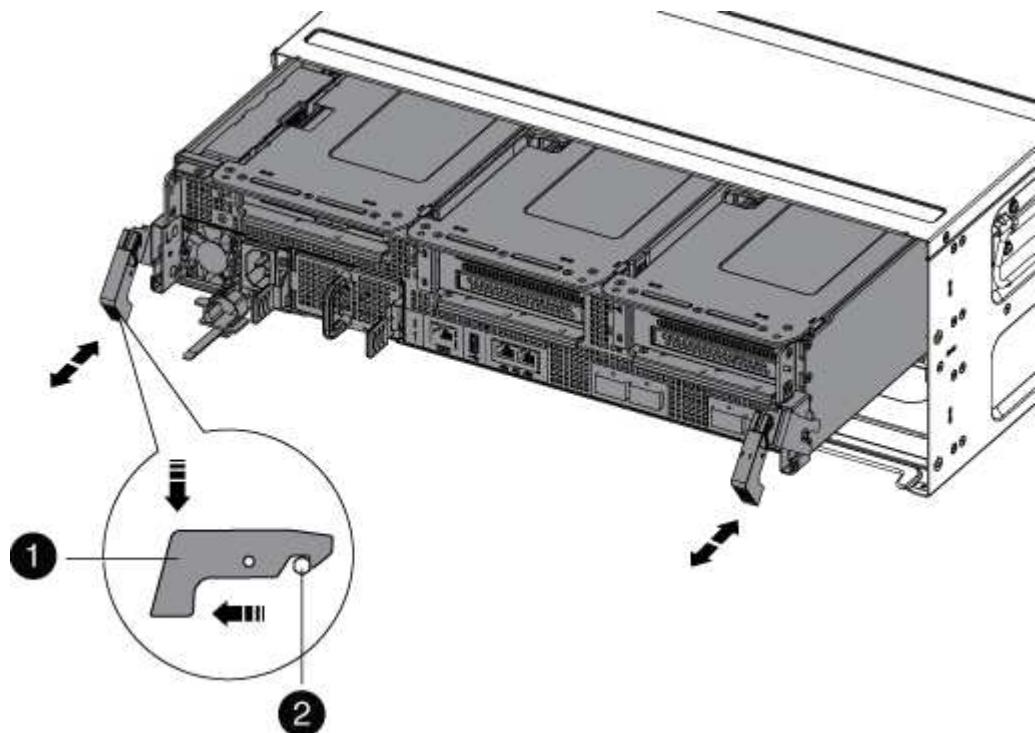
1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

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

3. Unplug the controller module power supply from the source, and then unplug the cable from the power supply.
4. Remove the cable management device from the controller module and set it aside.

5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.



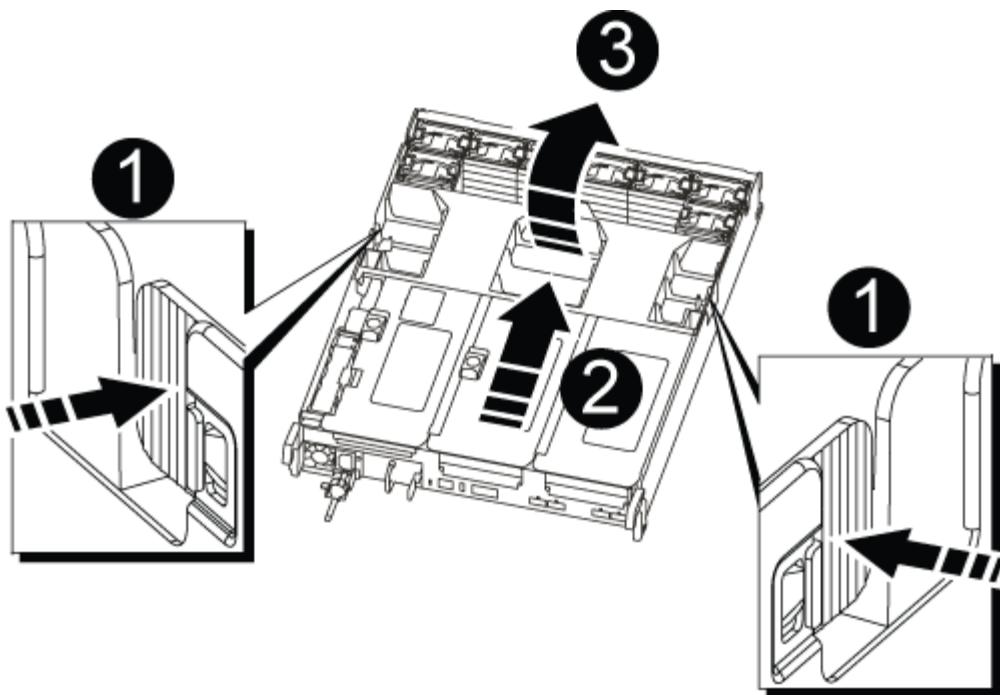
1	Locking latch
2	Locking pin

1. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

2. Place the controller module on a stable, flat surface, and then open the air duct:

- a. Press in the locking tabs on the sides of the air duct toward the middle of the controller module.
- b. Slide the air duct toward the fan modules, and then rotate it upward to its completely open position.



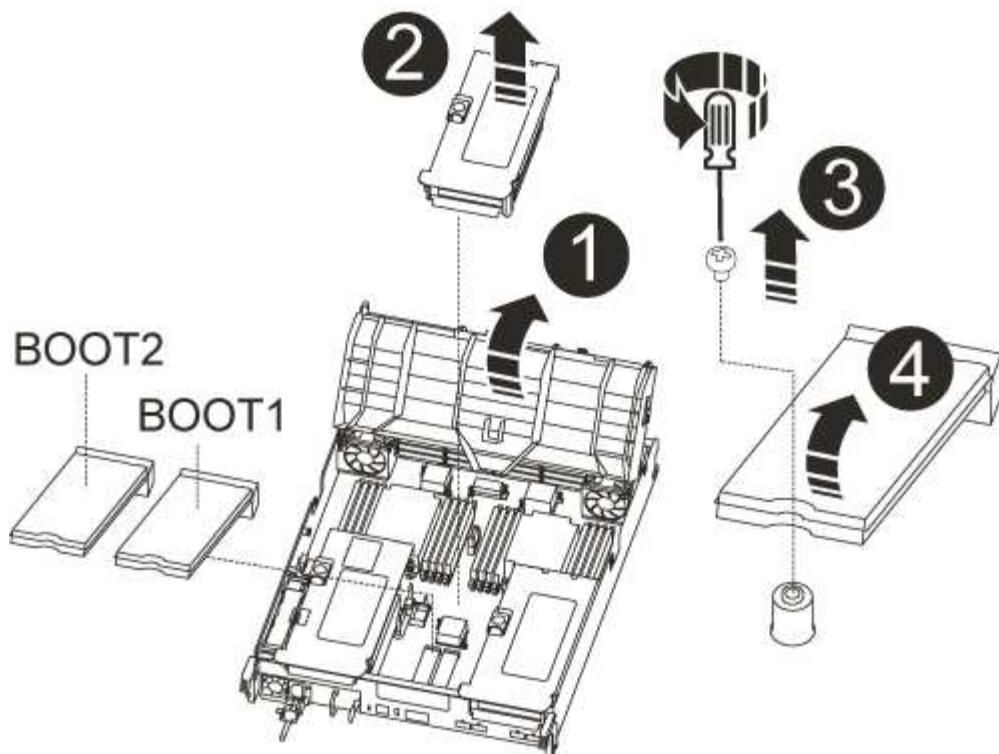
1	Air duct locking tabs
2	Risers
3	Air duct

## Step 2: Replace the boot media - AFF A700s

You must locate the failed boot media in the controller module by removing the middle PCIe module on the controller module, locate the failed boot media, and then replace the boot media.

You need a Phillips head screwdriver to remove the screw that holds the boot media in place.

1. If you are not already grounded, properly ground yourself.
2. Locate the boot media:
  - a. Open the air duct, if needed.
  - b. If needed, remove Riser 2, the middle PCIe module, by unlocking the locking latch and then removing the riser from the controller module.



1	Air duct
2	Riser 2 (middle PCIe module)
3	Boot media screw
4	Boot media

3. Locate the failed boot media.
4. Remove the boot media from the controller module:
  - a. Using a #1 Phillips head screwdriver, remove the screw holding down the boot media and set the screw aside in a safe place.
  - b. Grasping the sides of the boot media, gently rotate the boot media up, and then pull the boot media straight out of the socket and set it aside.
5. Align the edges of the replacement boot media with the boot media socket, and then gently push it into the socket.
6. Check the boot media to make sure that it is seated squarely and completely in the socket.  
If necessary, remove the boot media and reseat it into the socket.
7. Rotate the boot media down until it is flush with the motherboard.
8. Secure the boot media in place by using the screw.



Do not over-tighten the screw. Doing so might crack the boot media circuit board.

9. Reinstall the riser into the controller module.
10. Close the air duct:
  - a. Rotate the air duct downward.
  - b. Slide the air duct toward the risers until it clicks into place.

## Transfer the boot image to the boot media - AFF A700s

Transfer the boot image to the replacement boot media on an AFF A700s system using either the secondary boot media or a USB flash drive. This procedure includes restoring from the image on the secondary boot media as the primary method, or using a USB flash drive if the secondary boot media restoration fails or the image.tgz file is missing.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

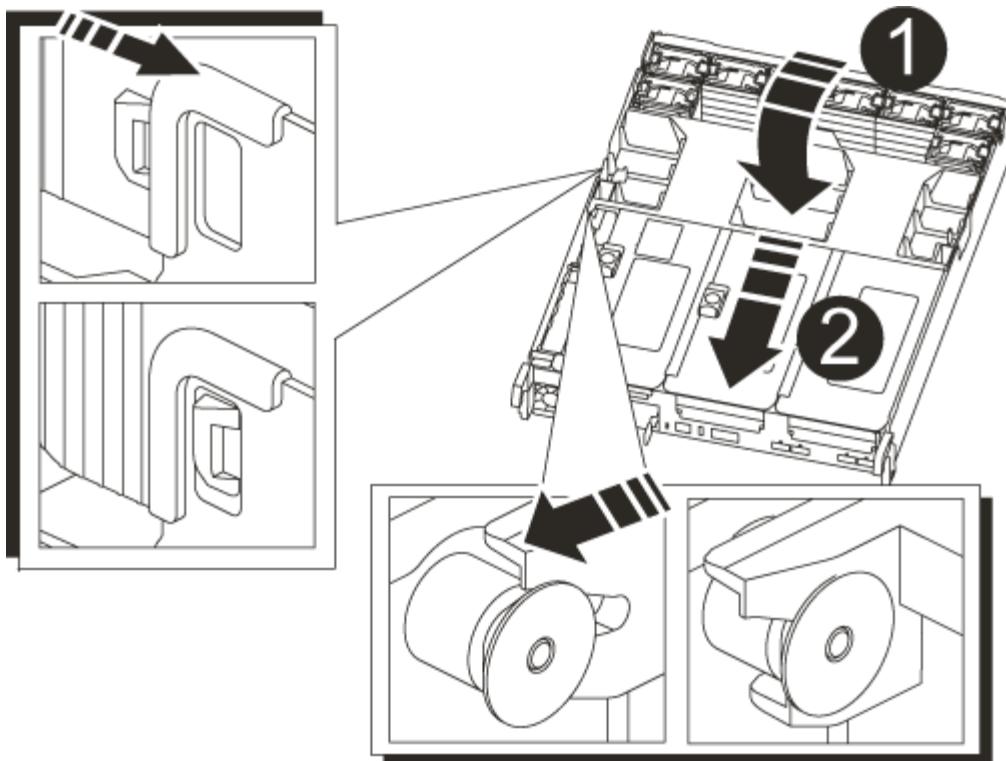
### Option 1: Transfer files using backup recovery from the second boot media

You can install the system image to the replacement boot media using the image on second boot media installed in the controller module. This is the primary method for transferring the boot media files to the replacement boot media in systems with two boot media in the controller module.

The image on the secondary boot media must contain an `image.tgz` file and must not be reporting failures. If `image.tgz` file is missing or the boot media reports failures, you cannot use this procedure. You must transfer the boot image to the replacement boot media using the USB flash drive replacement procedure.

#### Steps

1. If you are not already grounded, properly ground yourself.
2. If you have not already done so, close the air duct:
  - a. Swing the air duct all the way down to the controller module.
  - b. Slide the air duct toward the risers until the locking tabs click into place.
  - c. Inspect the air duct to make sure that it is properly seated and locked into place.



1	Air duct
2	Risers

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.
4. Reinstall the cable management device and recable the system, as needed.

When recabling, remember to reinstall the media converters (SFPs) if they were removed.

5. Gently push the controller module all the way into the system until the controller module locking hooks begin to rise, firmly push on the locking hooks to finish seating the controller module, and then swing the locking hooks into the locked position over the pins on the controller module.
6. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

7. Interrupt the boot process by pressing Ctrl-C to stop at the LOADER prompt.

If you miss this message, press Ctrl-C, select the option to boot to Maintenance mode, and then halt the controller to boot to LOADER.

8. From the LOADER prompt, boot the recovery image from the secondary boot media: `boot_recovery`

The image is downloaded from the secondary boot media.

9. When prompted, either enter the name of the image or accept the default image displayed inside the brackets on your screen.
10. After the image is installed, start the restoration process:
  - a. Record the IP address of the impaired controller that is displayed on the screen.
  - b. Press **y** when prompted to restore the backup configuration.
  - c. Press **y** when prompted to confirm that the backup procedure was successful.
11. From the partner controller in advanced privilege level, start the configuration synchronization using the IP address recorded in the previous step: `system node restore-backup -node local -target -address impaired_node_IP_address`
12. After the configuration synchronization is complete without errors, press **y** when prompted to confirm that the backup procedure was successful.
13. Press **y** when prompted whether to use the restored copy, and then press **y** when prompted to reboot the controller.
14. Exit advanced privilege level on the healthy controller.

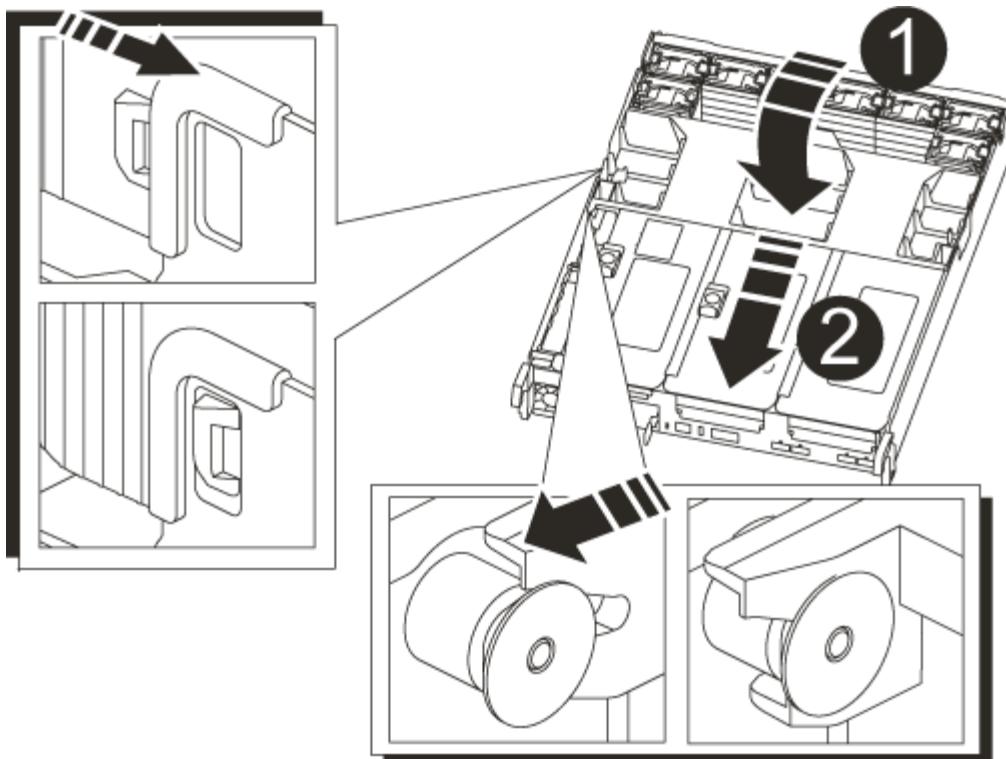
## Option 2: Transfer the boot image using a USB flash drive

This procedure should only be used if the secondary boot media restore failed or if the image.tgz file is not found on the secondary boot media.

- You must have a USB flash drive, formatted to FAT32, with at least 4GB capacity.
- A copy of the same image version of ONTAP as what the impaired controller was running. You can download the appropriate image from the Downloads section on the NetApp Support Site
  - If NVE is enabled, download the image with NetApp Volume Encryption, as indicated in the download button.
  - If NVE is not enabled, download the image without NetApp Volume Encryption, as indicated in the download button.
- If your system is an HA pair, you must have a network connection.
- If your system is a stand-alone system you do not need a network connection, but you must perform an additional reboot when restoring the var file system.

### Steps

1. If you are not already grounded, properly ground yourself.
2. If you have not already done so, close the air duct:
  - a. Swing the air duct all the way down to the controller module.
  - b. Slide the air duct toward the risers until the locking tabs click into place.
  - c. Inspect the air duct to make sure that it is properly seated and locked into place.



1	Air duct
2	Risers

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.
4. Reinstall the cable management device and recable the system, as needed.

When recabling, remember to reinstall the media converters (SFPs) if they were removed.

5. Insert the USB flash drive into the USB slot on the controller module.

Make sure that you install the USB flash drive in the slot labeled for USB devices, and not in the USB console port.

6. Gently push the controller module all the way into the system until the controller module locking hooks begin to rise, firmly push on the locking hooks to finish seating the controller module, and then swing the locking hooks into the locked position over the pins on the controller module.
7. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

8. Interrupt the boot process by pressing Ctrl-C to stop at the LOADER prompt.

If you miss this message, press Ctrl-C, select the option to boot to Maintenance mode, and then halt the controller to boot to LOADER.

9. Although the environment variables and bootargs are retained, you should check that all required boot environment variables and bootargs are properly set for your system type and configuration using the `printenv bootarg name` command and correct any errors using the `setenv variable-name <value>` command.

a. Check the boot environment variables:

- `bootarg.init.boot_clustered`
- `partner-sysid`
- `bootarg.init.flash_optimized` for AFF C190/AFF A220 (All Flash FAS)
- `bootarg.init.san_optimized` for AFF A220 and All-Flash SAN Array
- `bootarg.init.switchless_cluster.enable`

b. If External Key Manager is enabled, check the bootarg values, listed in the `kenv` ASUP output:

- `bootarg.storageencryption.support <value>`
- `bootarg.keymanager.support <value>`
- `kmip.init.interface <value>`
- `kmip.init.ipaddr <value>`
- `kmip.init.netmask <value>`
- `kmip.init.gateway <value>`

c. If Onboard Key Manager is enabled, check the bootarg values, listed in the `kenv` ASUP output:

- `bootarg.storageencryption.support <value>`
- `bootarg.keymanager.support <value>`
- `bootarg.onboard_keymanager <value>`

d. Save the environment variables you changed with the `savenv` command

e. Confirm your changes using the `printenv variable-name` command.

10. From the LOADER prompt, boot the recovery image from the USB flash drive: `boot_recovery`

The image is downloaded from the USB flash drive.

11. When prompted, either enter the name of the image or accept the default image displayed inside the brackets on your screen.

12. After the image is installed, start the restoration process:

- Record the IP address of the impaired controller that is displayed on the screen.
- Press `y` when prompted to restore the backup configuration.
- Press `y` when prompted to confirm that the backup procedure was successful.

13. Press `y` when prompted whether to use the restored copy, and then press `y` when prompted to reboot the controller.

14. From the partner controller in advanced privilege level, start the configuration synchronization using the IP address recorded in the previous step: `system node restore-backup -node local -target -address impaired_node_IP_address`

15. After the configuration synchronization is complete without errors, press `y` when prompted to confirm that the backup procedure was successful.
16. Press `y` when prompted whether to use the restored copy, and then press `y` when prompted to reboot the controller.
17. Verify that the environmental variables are set as expected.
  - a. Take the controller to the `LOADER` prompt.
 

From the ONTAP prompt, you can issue the command `'system node halt -skip-lif-migration-before -shutdown true -ignore-quorum-warnings true -inhibit-takeover true'`.
  - b. Check the environment variable settings with the `printenv` command.
  - c. If an environment variable is not set as expected, modify it with the `setenv environment-variable-name changed-value` command.
  - d. Save your changes using the `savenv` command.
  - e. Reboot the controller.
18. With the rebooted impaired controller displaying the `Waiting for giveback...` message, perform a giveback from the healthy controller:

If your system is in...	Then...
An HA pair	<p>After the impaired controller is displaying the <code>Waiting for giveback...</code> message, perform a giveback from the healthy controller:</p> <ol style="list-style-type: none"> <li>a. From the healthy controller: <code>storage failover giveback -ofnode partner_node_name</code> <p>The impaired controller takes back its storage, finishes booting, and then reboots and is again taken over by the healthy controller.</p> <p> If the giveback is vetoed, you can consider overriding the vetoes.</p> <p><a href="#">HA pair management</a></p> </li> <li>b. Monitor the progress of the giveback operation by using the <code>storage failover show-giveback</code> command.</li> <li>c. After the giveback operation is complete, confirm that the HA pair is healthy and that takeover is possible by using the <code>storage failover show</code> command.</li> <li>d. Restore automatic giveback if you disabled it using the <code>storage failover modify</code> command.</li> </ol>

19. Exit advanced privilege level on the healthy controller.

## Boot the recovery image - AFF A700s

Boot the ONTAP recovery image from the USB drive on an AFF A700s system to restore

the boot media. This procedure includes booting from the USB flash drive, restoring the file system, verifying environmental variables, and returning the controller to normal operation after boot media replacement.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

## Steps

1. From the LOADER prompt, boot the recovery image from the USB flash drive: `boot_recovery`

The image is downloaded from the USB flash drive.

2. When prompted, either enter the name of the image or accept the default image displayed inside the brackets on your screen.
3. Restore the var file system:

If your system has...	Then...
A network connection	<ol style="list-style-type: none"><li>Press <code>y</code> when prompted to restore the backup configuration.</li><li>Set the healthy controller to advanced privilege level: <code>set -privilege advanced</code></li><li>Run the <code>restore backup</code> command: <code>system node restore-backup -node local -target-address impaired_node_IP_address</code></li><li>Return the controller to admin level: <code>set -privilege admin</code></li><li>Press <code>y</code> when prompted to use the restored configuration.</li><li>Press <code>y</code> when prompted to reboot the controller.</li></ol>
No network connection	<ol style="list-style-type: none"><li>Press <code>n</code> when prompted to restore the backup configuration.</li><li>Reboot the system when prompted by the system.</li><li>Select the <b>Update flash from backup config (sync flash)</b> option from the displayed menu.</li></ol> <p>If you are prompted to continue with the update, press <code>y</code>.</p>

4. Ensure that the environmental variables are set as expected:
  - Take the controller to the LOADER prompt.
  - Check the environment variable settings with the `printenv` command.
  - If an environment variable is not set as expected, modify it with the `setenv environment-variable-name changed-value` command.
  - Save your changes using the `savenv` command.
5. The next depends on your system configuration:
  - If your system has onboard keymanager, NSE or NVE configured, go to [Restore OKM, NSE, and NVE as needed](#)

- If your system does not have onboard keymanager, NSE or NVE configured, complete the steps in this section.

6. From the LOADER prompt, enter the `boot_ontap` command.

If you see...	Then...
The login prompt	Go to the next Step.
Waiting for giveback...	<ol style="list-style-type: none"> <li>Log into the partner controller.</li> <li>Confirm the target controller is ready for giveback with the <code>storage failover show</code> command.</li> </ol>

7. Connect the console cable to the partner controller.

8. Give back the controller using the `storage failover giveback -fromnode local` command.

9. At the cluster prompt, check the logical interfaces with the `net int -is-home false` command.

If any interfaces are listed as "false", revert those interfaces back to their home port using the `net int revert` command.

10. Move the console cable to the repaired controller and run the `version -v` command to check the ONTAP versions.

11. Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.

## Restore encryption - AFF A700s

Restore encryption configuration on the replacement boot media for an AFF A700s system. This procedure includes completing post-replacement steps for systems with Onboard Key Manager (OKM), NetApp Storage Encryption (NSE), or NetApp Volume Encryption (NVE) enabled to ensure secure data access and proper system operation.

The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

Complete the appropriate steps to restore encryption on your system based on your key manager type. If you are unsure which key manager your system uses, check the settings you captured at the beginning of the boot media replacement procedure.

## Onboard Key Manager (OKM)

Restore the Onboard Key Manager (OKM) configuration from the ONTAP boot menu.

### Before you begin

Ensure you have the following information available:

- Cluster-wide passphrase entered while [enabling onboard key management](#)
- [Backup information for the Onboard Key Manager](#)
- Verification that you have the correct passphrase and backup data using the [How to verify onboard key management backup and cluster-wide passphrase](#) procedure

### Steps

#### On the impaired controller:

1. Connect the console cable to the impaired controller.
2. From the ONTAP boot menu, select the appropriate option:

ONTAP version	Select this option
ONTAP 9.8 or later	<p>Select option 10.</p> <p><b>Show example boot menu</b></p> <div style="border: 1px solid #ccc; padding: 10px; width: fit-content; margin: 10px auto; border-radius: 10px;"><p>Please choose one of the following:</p><p>(1) Normal Boot. (2) Boot without /etc/rc. (3) Change password. (4) Clean configuration and initialize all disks. (5) Maintenance mode boot. (6) Update flash from backup config. (7) Install new software first. (8) Reboot node. (9) Configure Advanced Drive Partitioning. (10) Set Onboard Key Manager recovery secrets. (11) Configure node for external key management.</p><p>Selection (1-11)? 10</p></div>

ONTAP version	Select this option
ONTAP 9.7 and earlier	<p>Select the hidden option <code>recover_onboard_keymanager</code></p> <p><b>Show example boot menu</b></p> <div style="border: 1px solid #ccc; padding: 10px; border-radius: 10px; background-color: #f9f9f9;"> <p style="margin: 0;">Please choose one of the following:</p> <ul style="list-style-type: none"> <li>(1) Normal Boot.</li> <li>(2) Boot without /etc/rc.</li> <li>(3) Change password.</li> <li>(4) Clean configuration and initialize all disks.</li> <li>(5) Maintenance mode boot.</li> <li>(6) Update flash from backup config.</li> <li>(7) Install new software first.</li> <li>(8) Reboot node.</li> <li>(9) Configure Advanced Drive Partitioning.</li> </ul> <p style="margin: 0;">Selection (1-19)?</p> <p style="margin: 0;"><code>recover_onboard_keymanager</code></p> </div>

3. Confirm that you want to continue the recovery process when prompted:

**Show example prompt**

This option must be used only in disaster recovery procedures. Are you sure? (y or n) :

4. Enter the cluster-wide passphrase twice.

While entering the passphrase, the console does not show any input.

**Show example prompt**

Enter the passphrase for onboard key management:

Enter the passphrase again to confirm:

5. Enter the backup information:

- a. Paste the entire content from the BEGIN BACKUP line through the END BACKUP line, including the dashes.

## Show example prompt

Enter the backup data:

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AA  
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AA  
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AA  
0123456789012345678901234567890123456789012345678901  
23  
1234567890123456789012345678901234567890123456789012  
34  
2345678901234567890123456789012345678901234567890123  
45  
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AA  
AAAAAAAAAAAAAAAAAAAAAA  
AA  
AAAAAAAAAAAAAAAAAAAAAA  
AA  
-----END  
BACKUP-----
```

- b. Press Enter twice at the end of the input.

The recovery process completes and displays the following message:

Successfully recovered keymanager secrets.

### Show example prompt

```
Trying to recover keymanager secrets....  
Setting recovery material for the onboard key manager  
Recovery secrets set successfully  
Trying to delete any existing km_onboard.wkeydb file.  
  
Successfully recovered keymanager secrets.  
  
*****  
*****  
* Select option "(1) Normal Boot." to complete recovery  
process.  
*  
* Run the "security key-manager onboard sync" command to  
synchronize the key database after the node reboots.  
*****  
*****
```



Do not proceed if the displayed output is anything other than Successfully recovered keymanager secrets. Perform troubleshooting to correct the error.

6. Select option 1 from the boot menu to continue booting into ONTAP.

### Show example prompt

```
*****
*****
* Select option "(1) Normal Boot." to complete the recovery
process.
*
*****
*****
(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
(9) Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 1
```

7. Confirm that the controller's console displays the following message:

Waiting for giveback...(Press Ctrl-C to abort wait)

**On the partner controller:**

8. Giveback the impaired controller:

```
storage failover giveback -fromnode local -only-cfo-aggregates true
```

**On the impaired controller:**

9. After booting with only the CFO aggregate, synchronize the key manager:

```
security key-manager onboard sync
```

10. Enter the cluster-wide passphrase for the Onboard Key Manager when prompted.

## Show example prompt

Enter the cluster-wide passphrase for the Onboard Key Manager:

All offline encrypted volumes will be brought online and the corresponding volume encryption keys (VEKs) will be restored automatically within 10 minutes. If any offline encrypted volumes are not brought online automatically, they can be brought online manually using the "volume online -vserver <vserver> -volume <volume\_name>" command.



If the sync is successful, the cluster prompt is returned with no additional messages. If the sync fails, an error message appears before returning to the cluster prompt. Do not continue until the error is corrected and the sync runs successfully.

### 11. Verify that all keys are synced:

```
security key-manager key query -restored false
```

The command should return no results. If any results appear, repeat the sync command until no results are returned.

### On the partner controller:

### 12. Giveback the impaired controller:

```
storage failover giveback -fromnode local
```

### 13. Restore automatic giveback if you disabled it:

```
storage failover modify -node local -auto-giveback true
```

### 14. If AutoSupport is enabled, restore automatic case creation:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

## External Key Manager (EKM)

Restore the External Key Manager configuration from the ONTAP boot menu.

### Before you begin

Gather the following files from another cluster node or from your backup:

- /cfcard/kmip/servers.cfg file or the KMIP server address and port
- /cfcard/kmip/certs/client.crt file (client certificate)
- /cfcard/kmip/certs/client.key file (client key)
- /cfcard/kmip/certs/CA.pem file (KMIP server CA certificates)

## Steps

### On the impaired controller:

1. Connect the console cable to the impaired controller.
2. Select option 11 from the ONTAP boot menu.

#### Show example boot menu

```
(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
(9) Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 11
```

3. Confirm you have gathered the required information when prompted:

#### Show example prompt

```
Do you have a copy of the /cfcard/kmip/certs/client.crt file?
{y/n}
Do you have a copy of the /cfcard/kmip/certs/client.key file?
{y/n}
Do you have a copy of the /cfcard/kmip/certs/CA.pem file? {y/n}
Do you have a copy of the /cfcard/kmip/servers.cfg file? {y/n}
```

4. Enter the client and server information when prompted:

- a. Enter the client certificate (client.crt) file contents, including the BEGIN and END lines.
- b. Enter the client key (client.key) file contents, including the BEGIN and END lines.
- c. Enter the KMIP server CA(s) (CA.pem) file contents, including the BEGIN and END lines.
- d. Enter the KMIP server IP address.
- e. Enter the KMIP server port (press Enter to use the default port 5696).

**Show example**

```
Enter the client certificate (client.crt) file contents:  
-----BEGIN CERTIFICATE-----  
<certificate_value>  
-----END CERTIFICATE-----
```

```
Enter the client key (client.key) file contents:  
-----BEGIN RSA PRIVATE KEY-----  
<key_value>  
-----END RSA PRIVATE KEY-----
```

```
Enter the KMIP server CA(s) (CA.pem) file contents:  
-----BEGIN CERTIFICATE-----  
<certificate_value>  
-----END CERTIFICATE-----
```

```
Enter the IP address for the KMIP server: 10.10.10.10  
Enter the port for the KMIP server [5696]:
```

```
System is ready to utilize external key manager(s).  
Trying to recover keys from key servers....  
kmip_init: configuring ports  
Running command '/sbin/ifconfig e0M'  
..  
..  
kmip_init: cmd: ReleaseExtraBSDPort e0M
```

The recovery process completes and displays the following message:

```
Successfully recovered keymanager secrets.
```

**Show example**

```
System is ready to utilize external key manager(s).  
Trying to recover keys from key servers....  
Performing initialization of OpenSSL  
Successfully recovered keymanager secrets.
```

5. Select option 1 from the boot menu to continue booting into ONTAP.

### Show example prompt

```
*****
*****
* Select option "(1) Normal Boot." to complete the recovery
process.
*
*****
*****
(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
(9) Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 1
```

6. Restore automatic giveback if you disabled it:

```
storage failover modify -node local -auto-giveback true
```

7. If AutoSupport is enabled, restore automatic case creation:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

## Return the failed part to NetApp - AFF A700s

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information. The AFF A700s system supports only manual boot media recovery procedures. Automated boot media recovery is not supported.

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